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IN THE

Supreme Court of the United States

OCTOBER TERM, 1942

UNITED STATES OF AMERICA upon the relation and for the use of the TENNESSEE VALLEY AUTHORITY,
Petitioner,

v.

W. V. N. POWELSON, assignee and successor in interest of Southern States Power Company, a Corporation, *et al.*

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE FOURTH CIRCUIT

BRIEF FOR RESPONDENT ON REARGUMENT

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IN THE

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OCTOBER TERM, 1942

No. 3

UNITED STATES OF AMERICA UPON THE RELATION AND FOR THE USE OF THE TENNESSEE VALLEY AUTHORITY, *Petitioner*,

v.

W. V. N. POWELSON, ASSIGNEE AND SUCCESSOR IN INTEREST OF SOUTHERN STATES POWER COMPANY, A CORPORATION, *et al.*

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE FOURTH CIRCUIT

BRIEF FOR RESPONDENT ON REARGUMENT

Petitioner has devoted about one-half of its brief on reargument to the contention that "the conclusion of the courts below that the property (of Respondent) had water power value is unsupported by and contrary to the evidence". In the course of its argument it makes a number of sweeping statements which, if accepted, would go far to destroy Respondent's case. Petitioner contends that this Court should re-find the facts and make a new award.

In each of the three tribunals below, Respondent carried successfully the burden of establishing by the preponder-

ance of the testimony that its property, condemned in this action, possessed water power value, that that was its highest value, and what that value was. That burden it is confident it can carry successfully in this Court. But in view of the great emphasis placed by Petitioner in its brief on reargument on the issue of fact above referred to, and in order to assist the Court in determining where the truth of the matter lies, Respondent is including in this brief a condensed but comprehensive statement of the proof in the record on the basis of which each of the tribunals below found as a fact that Respondent's property taken herein has water power value.

Following the statement will be found a discussion of the legal questions arising on the record and discussed by Petitioner in its brief on reargument. There is included a consideration of the legislative history of Section 25 of the Tennessee Valley Authority Act and the proper interpretation of the provisions thereof (See appendix A).

There are several characteristics of Respondent's proof which Respondent is certain have impressed each tribunal which has considered this case and which it trusts will be noted by this Court—

(1) The proof is comprehensive. Every element necessarily involved in the determination of the presence of water power value is covered in detail. No factor, even though of minor significance, is omitted.

(2) The data underlying each branch of the subject are as accurate as the nature of that branch permits. Wherever possible official records are relied on. Where that is not possible, the basic evidence is of such a character that a Court could accept it with confidence in its accuracy. Guessing was not indulged in.

(3) Respondent brought to the problem a high degree of engineering skill and spared no pains or expense to present to the Court a body of proof meeting all of those

standards which engineers, scientists, and businessmen are accustomed to expect in transactions involving investment of large sums of money in industrial enterprises.

It is not surprising that on many phases of the subject Petitioner made no attempt to controvert the conclusions reached by Respondent and in practically no branch of the subject did it seriously question the accuracy of the basic data.

Although Petitioner in two motions filed during the hearing of this case in the District Court, moved to strike considerable portions of Respondent's testimony and of its own testimony, there still remains in the record a large mass of testimony, as to the competency of which no question has been raised. It is Respondent's contention that in the testimony not objected to, and in a small amount of additional testimony as to the competency of which there can be no serious question, there is an ample basis for the conclusion of the tribunals below, that Respondent's property possessed water power value.

The basic problem presented to each of the three tribunals below was to determine whether the best and highest use to which the condemned property of Respondent could have been devoted on the date of the taking was its use in connection with other property of Respondent as an integral and necessary part of an integrated four-dam hydro-electric project; that is, whether the property's highest value was as an integrated water power, and, if so, what that value was.

This problem, in the last analysis, was substantially the same as that which would have confronted a prospective purchaser for Respondent's property desirous of buying the same and of determining what price he was willing to pay for the property in its then condition.

The methods such a prospective purchaser would have followed in solving this problem, the considerations to which he would have given weight, the information he would have sought from the owner, the investigations he would have

made—everything he would naturally and reasonably have done—all of these procedures were properly to be considered by each of the tribunals below in solving the problem with which they were confronted.

The Petitioner, at the beginning of the hearing before the Commissioners, agreed with this position. Mr. Fowler, leading trial counsel for the Petitioner before the Commissioners, said:

> "We agree with Mr. Kresel (of counsel for Respondent) in one position, which I think is sensible, and that is his statement that anything that may reasonably be applied to influence the value of the property in the mind of a prospective purchaser is entertainable by the Court." (Comm. Tr. 183)

This Court in *Olson* vs. *United States*, 292 U. S., 246-257, in discussing the proper method of arriving at just compensation for the taking of flowage easements upon lands, said:

> "Flowage easements upon these lands were not currently bought or sold to such an extent as to establish prevailing prices, at or as of the time of the expropriation. As that measure (*United States* v. *New River Collieries*, 262 U. S., 341, 344) is lacking, the market value must be estimated. In respect of each item of property that value may be deemed to be the sum which, considering all the circumstances, could have been obtained for it; that is, the amount that in all probability would have been arrived at by fair negotiations between an owner willing to sell and a purchaser desiring to buy. In making that estimate there should be taken into account all considerations that fairly might be brought forward and reasonably be given substantial weight in such bargaining."

A prospective purchaser investigating Respondent's property would be interested in the following matters:

(1) How much dependable hydro-electric power can the property develop?

(2) What will it cost to make the development?

(3) What will be the over-all cost to own, operate, and maintain the enterprise after development?

(4) Is there a market for the power so produced and, if so, what price could be obtained therefor?

With answers to these questions, the purchaser could determine whether or not the development was commercially feasible—whether it would probably yield a profit commensurate with the investment and risk involved. In making his investigation undoubtedly he would give weight to the opinions of others competent to judge on the commercial feasibility of the development. On some of the questions requiring consideration, the prospective purchaser could expect to arrive at highly accurate conclusions. On others he could expect to arrive at conclusions dependable and reliable within reasonable limits; that is, within the limits of risk ordinarily acceptable to business men in engaging in large enterprises. The more careful and detailed the investigation, the more reliable the sources of information relied on, the more skilled and experienced the experts secured to pass on the technical questions presented, the more confidence the prospective purchaser would have in the result obtained, and the more certain would he be that the fair market price of the property had been accurately estimated and could be relied on.

This method of approaching the problem was approved by Petitioner's experts who testified as to the sound method for determining the commercial feasibility of a water power project. One expert, Mr. W. F. Uhl, laid down the principal points to be considered in determining the market value of riparian lands for water power (R. 660-661). His ten points are covered by the four given above.

Another expert for Petitioner, Mr. Lewis E. Ayres, testified as follows:

> "Q. In your opinion, is it a sound or unsound way to determine commercial feasibility of a project,

to estimate the amount of output, the cost of development, the amount of income, and the amount of annual charges, and thereby arrive at some figure as to where [whether] you would have a net income or surplus; is that a sound way to go about it, Mr. Ayres?

"A. That is the only way I know to go about it." (R. 696).

To meet the burden of establishing water power value in its lands and to lay a basis for estimating the value thereof, Respondent offered voluminous and authoritative testimony on each of the four points above listed, going into sufficient detail to establish each conclusion reached with a high and proper degree of certainty.

It was shown (Res. Ct. Ex. R-28, offered Ct. Tr. 808):

(1) That Respondent's proposed integrated four-dam hydro-electric development could supply a firm demand capacity of 132,000 k.w. and could produce each year 577,070,000 k.w.h. of primary power at switchboard voltage and at 50 per cent load factor, or 522,859,000 k.w.h. of super-primary power at switchboard voltage and at 35 per cent annual load factor with a demand capacity of 170,000 k.w.;*

(2) That the over-all cost of the development including transmission lines to market, but exclusive of the purchase price of Respondent's property, would be between $32,000,000 and $35,000,000, depending upon the type of power to be supplied;

(3) That the annual over-all cost to own, operate, and maintain the enterprise would vary from $1,900,000 to $2,150,000, according to the type of power; and

(4) That a growing market for power more than sufficient to absorb Respondent's entire output, existed within a reasonable distance of the point of production; that

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* See Respondent's Court Exhibit 21, R. 1040-1042, offered Ct. Tr. 765, for definitions of electrical terms.

primary power at 50 per cent load factor could be sold at the market for 5.5 mills per k.w.h. and super-primary power at 33 per cent load factor could be sold at the market for 7 mills per k.w.h., or for delivery at transmission line voltage at place of generation for 6.34 mills per k.w.h.

In addition to the foregoing, it was shown that Respondent's property had long been regarded by those in a position to know and whose judgment was entitled to weight, as a valuable water power property, and that former owners of the property and those seeking to acquire an interest therein through litigation had invested large sums of money on the faith of their judgment that the property possessed substantial water power value.

All of this proved sufficient to satisfy each of the tribunals below that Respondent was correct in its contention that the property condemned in this action had on the date of the taking a substantial value for hydro-electric purposes and that this was its highest and best use. Each tribunal below made its award to Respondent on this theory.

After weighing all the factors, the Commissioners said:

> "After giving proper allowance for all the advantages the Commission finds the property to possess and after discounting same by all the disadvantages the Commission finds inherent in the property, a balance still subsists in favor of the use of the property as the site of a hydro-electric generating plant" (R. 773-774).

The three-judge District Court found:

> "The Court finds as a fact that the land in question can be used as the site of a hydro-electric power plant and is suitable for said purpose. * * * The Court further finds that the employment of said property as the site for a hydro-electric power plant furnishes the use or basis for the greatest value inherent in the property" (R. 1055).

The Circuit Court of Appeals said:

> "The evidence established beyond question, we think, that considering the ever-increasing demand for

electric power the property did have value for water power purposes" (R. 1076).

A brief summary of the facts established by the testimony on each of the points requiring consideration clearly demonstrates that the unanimous conclusion of the three tribunals rested upon a broad and sound foundation.

How Much Dependable Hydro-Electric Power Can Respondent's Property Develop?

To determine the capacity of an undeveloped property to produce dependable hydro-electric power, the following factors must be considered:

(a) The available hydraulic head which can be developed;

(b) The flow of the stream;

(c) The existence and location of suitable sites for the erection of dams;

(d) The storage capacity of reservoirs that would be created by dams of different practicable heights at the various dam sites;

(e) The drainage area above each of said dam sites;

(f) The geological characteristics of the dam sites and the reservoirs; and

(g) The best combination and the best location and height of feasible dams with resulting reservoirs to produce in integrated use the maximum dependable power.

(The ultimate determination of the question of where and what height dams should be built depends also on the estimates of cost thereof; for the ultimate aim of the engineer is to develop the maximum dependable power at the lowest unit cost of development.)

Available Head

The section of Hiwassee River included in Respondent's planned development lies in Cherokee and Clay Counties, North Carolina, and extends from the North Carolina-Tennessee State line near a point known as Appalachia, up the river for a distance of forty-six miles. There was also included in the plan of development a nineteen-mile section of the Nottely River, an important tributary of the Hiwassee,* lying in Union County, Georgia (Res. Comm. Exs. R-8, R-17, Tabs 1 and 2, offered Comm. Tr. 127, 156). Within this territory in North Carolina and Georgia, at the time of the institution of this proceeding, Respondent owned and held for water power purposes about 22,000 acres of land having a river frontage of about ninety-six miles, including the sites of the four dams proposed to be erected as hereinafter set out, in order to completely develop the commercial possibilities for water power generation of the Hiwassee River basin above the North Carolina-Tennessee State line. In addition, Respondent had acquired from the State of North Carolina and possessed the exclusive prior right to develop within its adopted boundaries the waters of Hiwassee River in the State of North Carolina for hydro-electric purposes and in Georgia had acquired the prior right to develop the Nottely River within the marked boundaries of its Nottely development (R. 24-25; Res. Comm. Ex. R-1, offered R. 24; R. 44-64; Res. Comm. Ex. R-19, offered Comm. Tr. 221).

In the forty-six mile stretch of river referred to, there is a fall of 555 feet, which is a large fall as rivers go. In the nineteen-mile stretch of Nottely River the fall is 200 feet (R. 72; Res. Comm. Ex. R-17, Tab 2, offered Comm. Tr. 156).

Immediately below Appalachia, the river enters a steep narrow gorge in which there is a fall of 415 feet in a dis-

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* Title to the Georgia property was vested in Union Power Company, a Georgia corporation and a wholly owned subsidiary of Southern States Power Company (R. 34).

tance of seventeen and one-half miles (R. 73). Respondent offered evidence to show that the hydro-electric development of the gorge was practicable only in connection with the development of Respondent's property above, and that through its development more than 500,000,000 k.w.h. per year could be added to the 577,070,000 k.w.h. of dependable salable energy from Respondent's adopted developments (R. 821-822). The presence of the gorge under this state of facts plainly was a factor tending to make Respondent's property more attractive in the eyes of a prospective purchaser.

Stream Flow

The watersheds of the upper Hiwassee and Nottely Rivers lie in a territory having the heaviest annual rainfall of any section of the United States with the single exception of a territory on the Pacific Coast along the Washington-Oregon State line. The records of the United States Weather Bureau show an average annual rainfall of seventy inches on the watersheds of Hiwassee and Nottely Rivers included in the drainage basins above Respondent's proposed dams (R. 91-92).

The daily stream flow records of the United States Geological Survey for the Hiwassee and Nottely Rivers are available to the public and extend over an unusually long period of time. The gauge at Murphy, N. C., within a mile of the site of Respondent's proposed Murphy dam, was established June, 1896. The gauge at Reliance, Tennessee, about twenty-two miles below Respondent's Appalachia dam site, was established in August, 1900. The gauge at Tomatla on Valley River, a tributary of Hiwassee flowing into it from the east just below Murphy, N. C., was established in June, 1904, and the gauge at Ranger on the Nottely River, twelve miles below Respondent's Nottely dam site, was established in February, 1901 (R. 75-76). In addition, there are available daily stream flow records from

1874 on the Tennessee River at Chattanooga, thirty-six miles below the mouth of the Hiwassee River (R. 137-140, Res. Comm. Ex. R-242, offered Comm. Tr. 1139). By studying the records of all these gauges over the long period of their maintenance and considering in that connection the areas of the drainage basins above the various gauges and the areas of the drainage basins above Respondent's various dam sites, it was possible to determine with a very high degree of accuracy that the most adverse conditions for power generation on the Hiwassee River since 1874 occurred after the time when the Government began to keep a record of daily stream flows at Murphy and Reliance on Hiwassee River. It is, therefore, possible to determine with a very high degree of accuracy the daily flow of the river at each of Respondent's dam sites throughout the said period of most adverse conditions for power generation which centered in the year 1925; and to determine that the average annual flow of Hiwassee River at Respondent's dam sites, measured in cubic feet per second per square mile of drainage basin, is very high compared with that of other hydro power locations (R. 104-108).

Dam Sites

After years of surveying and engineering study, Respondent had adopted by proper steps four sites for the erection of dams. The lowest on the Hiwassee River is at Appalachia, near the North Carolina-Tennessee State line, at normal low water eelvation of 1165 feet above sea level with a head of 110 feet. The next, eleven miles up that river, was at the so-called Powelson or Hiwassee site (where Petitioner has since erected its Hiwassee Dam). This site was at low water elevation 1275 feet above sea level, with an adopted head of 245 feet. The third site, twenty-one and one-half miles farther up the river, was just above the Town of Murphy at low water elevation 1520 feet above sea level with a head of 200 feet. The fourth site was on

Nottely River, in the State of Georgia, about twenty miles above its confluence with the Hiwassee River and was at low water elevation 1610 feet above sea level with a head of 200 feet (R. 34-37; Res. Comm. Ex. R-8, offered Comm. Tr. 127).

The soundness of Respondent's final conclusion as to the proper number, location and height of dams is confirmed by the fact that the experts testifying in behalf of Petitioner, all agreed that a four-dam development with dams at substantially the same sites and of substantially the same heights, as planned by Respondent, would produce the best development results. Also, it appears from the record that Tennessee Valley Authority selected Respondent's Powelson site as the site for its first dam on Hiwassee River, with a head of 251 feet as compared with a head of 245 feet for Respondent's Powelson dam (Res. Comm. Ex. R-249, Tab 22, offered Comm. Tr. 1179). The Court is asked to take judicial notice of the fact, which is common knowledge and has been widely publicized, that the Authority has since erected an earth storage dam with head somewhat less than 200 feet, at Respondent's adopted site on Nottely River, and an earth storage dam on the Hiwassee River several miles above the Town of Murphy (but not at Respondent's Murphy site), and is completing a concrete dam in North Carolina just above the Tennessee line, with a head of approximately 105 feet and within a few hundred yards of Respondent's Appalachia dam site.

The value of Respondent's extensive surveying and years of engineering study, as a result of which it determined the question as to the proper location of its dam site, is well illustrated by evidence in the record with respect to the experience of the Tennessee Valley Authority in the matter of dam site location.

When the Authority began consideration of a plan to erect a dam on Hiwassee River, a site known as the Coleman site, about five miles above the Powelson, was apparently seriously considered. This site had been pointed out as a good place for a dam by the United States Army engineers

in a report issued in 1928. The use of that site involved the construction of a diversion tunnel. Respondent had previously considered and discarded this site as greatly inferior to the Powelson site (R. 64, 65, Res. Comm. Ex. R.-190, Tab 3, offered R. 63).

In August, 1934, at a meeting between Mr. Powelson and Mr. Bock, Asst. Chief Engineer of the Authority, when the Authority was contemplating or investigating for a dam at the Coleman site and conducting drilling operations there, Mr. Powelson told Mr. Bock that the Coleman site was inferior and should be abandoned in favor of the Powelson site. A few months later the Authority apparently became satisfied as to the soundness of this advice and began work at the Powelson or Hiwassee site, where the Hiwassee dam was afterward erected (R. 64-65).

This bit of advice from Mr. Powelson to Mr. Bock, coming, as he knew it did, from an engineer of ability and experience and based, as he knew it was, on a great deal of surveying and engineering investigation, placed in the hands of the Tennessee Valley Authority, without cost, information that otherwise could only have been obtained after months of study and much expense. As a matter of fact, if Mr. Powelson's suggestion had not been made and if the Authority had not thoroughly exhausted the subject of the proper site for its dam, it might have made a serious mistake and erected the dam at the wrong site. The result would have been to greatly reduce the amount of dependable power that a complete development of the resources of the river would produce.

It would have been of tremendous advantage to a prospective purchaser in January, 1936, to deal with an owner who was able to give him complete and accurate information on all the necessary factors involved in a plan of development. In passing, it might be added that Mr. Powelson also pointed out to Mr. Bock the site for the dam on the Nottely River, not theretofore revealed by any report or publication. This is the site of the Tennessee Valley Authority's Nottely dam recently completed.

Reservoir Capacity

Throughout the stretch included in the Appalachia and Powelson reservoirs the river is narrow with steep banks, the width of the Powelson site at river level being 220 feet, but above the Murphy and Nottely dam sites (which are narrower) there are very wide valleys unusual at such high elevations above sea level. This is an ideal situation, making possible the development of a high head with dams at points where the river is narrow and the banks high and steep and the creation of large reservoirs in the broad valleys above (R. 45, 75). The storage capacities and elevations of the four reservoirs, determined after extensive and careful surveying by Respondent, are as follows:

Respondent's Development	*Reservoir Volume in Cublic Feet*	*Reservoir Volume in Acre Feet*	*Elevation of Top Surface of Reservoir above Sea Level*
Appalachia	2,860,000,000	65,656	1275
Powelson	17,250,000,000	396,006	1520
Murphy	39,250,000,000	901,056	1720
Nottely	22,290,000,000	511,708	1820
	81,650,000,000	1,874,426	

(R. 45, 76, Res. Comm. Ex. R-203, Tab 4, offered R. 75)

Drainage Area

The drainage basins above the four sites are as follows:

Appalachia	1,020	square miles
Powelson	974	" "
Murphy	410	" "
Nottely	215	" "

(R. 94, Res. Comm. Ex. R-280, Tab 25, offered R. 200)

Geological Characteristics

From a geological point of view the territory embraced in Respondent's proposed development presented certain very great advantages. The rock formations underlying the reservoirs and dam sites are not soluble and, aside from some surface decay, the rock is water tight, hard, and strong and capable of supporting great weight.

In their report to Congress in March, 1936 (Res. Comm. Ex. R-204, P. 96, offered R. 77), the Directors of the Tennessee Valley Authority, in discussing this subject, said:

> "From its (Hiwassee River) headwaters to near the Town of Wetmore, Tennessee, it flows across various igneous and metamorphic rocks * * *. These are to some extent subject to surface decay but except for that point offer excellent foundations. None of them are subject to subsurface solution and therefore they do not give rise to caves or sinks."

Before the three-judge U. S. District Court, the following colloquy occurred between Judge Webb and leading counsel for Petitioner:

> "JUDGE WEBB: I understood the question was that it (the Powelson dam site) was a good place for a dam, with the shoals there.
>
> "MR. FITTS: Of course, there are hundreds of those, thousands of them at other places in the river, with the same thing.
>
> "JUDGE WEBB: I am talking about that place (the Powelson dam site). Is it a good place to build a dam?
>
> "MR. FITTS: Yes, sir, physically, it is a good place to build a dam and nobody has ever denied that."
>
> (Ct. Tr. 445-446)

The importance of these considerations will be realized when one takes note of the experience of the Tennessee

Valley Authority at its Norris Dam and reservoir. In the report just above referred to, (Page 89 of Res. Comp. Ex. R-204, offered R. 77), the Directors of the Tennessee Valley Authority described the character of the rock which underlies the Norris reservoir and pointed out that it consists substantially of limestone rock formations, of which they say, "all are soluble formations, most of them deeply weathered". Dr. Morgan, Chairman of the Authority, reported to Congress that trouble had been experienced with leakage through the bottom of the Norris reservoir and that up to a million dollars had been spent in an effort to stop the leakage (Res. Comm. Ex. R-205, Page 166, offered Comm. Tr. 872).

This is a situation which the Authority was at pains to point out in its said report to Congress would not be experienced in its proposed development on the Hiwassee River.

The Best Combination of Dams, Hydraulic Heads and Reservoirs

Having before it all of the information outlined above, Respondent, prior to 1936, at great cost to itself, had found the answers to two vitally important questions:

(1) Of all of the feasible plans of development of Respondent's properties, what combination of dams and heads and reservoirs would yield the maximum amount of dependable power per dollar of investment?

(2) What is the maximum amount of dependable power which the development will produce?

The answer to the first of these questions must be arrived at through a trial and error process. Every practicable plan of development of the river must be studied sufficiently to determine whether it is superior or inferior to another plan or plans (R. 88).

In the process it was established that of many dam sites, reservoirs, and plans of development surveyed and staked out by Respondent, all had to be finally discarded except the four dam sites, four dams, and four reservoirs located and adopted by respondent and listed above.

No other plan of integrated development equals this one. But the money spent in investigations of other plans and sites found to be inferior is not without an adequate return. The cost of discoveries and investigations leading to the best plan is a necessary part of the cost of knowing and possessing the best plan (Res. Comm. Ex. R-187, offered Comm. Tr. 731).

That knowledge, possessed by the owner of undeveloped water power lands, adds to their market value because that knowledge can be used in a purchase and sale negotiation to increase the price which the purchaser would be willing to pay over that which he would be willing to pay otherwise (R. 88-89).

To make the discoveries and investigations which will lead to the best plan of development, involves a very high degree of engineering skill and requires very extensive surveys of a number of possible reservoirs and possible dam sites. This fact accounts in a large measure for the engineering costs incurred by Respondent during its period of ownership of the property and the very substantial expenses incurred in the New York office where Mr. Powelson, the President of the Company, and himself an hydro-electric engineer of great experience and ability, directed and carried out many of the studies (R. 292-305; Res. Comm. Ex. R-187, offered Comm. Tr. 731).

The answer to the second question involved a study of the U. S. Government daily stream flow records of the Hiwassee and Tennessee Rivers over the entire period during which such records were available, and the determination, on the basis of past records extending over sixty years, of the most adverse stream flow conditions which an operation of Respondent's adopted hydro-electric develop-

ment in the Hiwassee basin would have had to meet had that development been in continuous operation since 1874; and a further elaborate investigation in order to forecast the dependable power that could be produced by Respondent's development if the worst flow conditions for power between 1874 and 1936 should be duplicated in the future. The unusually full and complete daily stream flow records available to Respondent made it possible to do this work with great accuracy, but the labor involved was tremendous, some of the log sheets made in connection with the investigation containing as many as 25,000 entries. (See Tab 28, Res. Comm. Ex. R-300, offered Comm. Tr. 2196, for one of the log sheets greatly reduced in size.)

All of the foregoing facts and the underlying log sheets, calculations, records, and other data relating to the quantity of dependable power, were tendered in open court by the Respondent to the Petitioner so that it might check Respondent's methods of investigation, the accuracy of its calculations and the soundness of its conclusions (R. 243-244; R. 348, 354). The offer was not accepted. All of said data would have been tendered by Respondent to any prospective purchaser of the property and if found accurate would obviously have been of great value in satisfying the purchaser on one of the matters in which he would be particularly interested. Considering the completeness of the investigation and the evident care with which every step was taken, it is not surprising that Petitioner made no serious attempt to point out errors in Respondent's calculations and methods, or question the results arrived at.

Mr. Lewis E. Ayres, one of the experts upon whom Petitioner relied, in discussing the dependable power that could be produced by development of Respondent's property and after indicating that he followed a course of procedure designed to develop the information set out above, said:

> "Briefly, the result of that computation is that the theoretical power of the river is substantially as testified in this case" (R. 682).

Mr. Waddell, another expert who testified for Petitioner, referring to the same subject, said:

> "I proceeded on my basis of estimates of power pretty much the same way that Mr. Powelson did. * * * the way I arrived at that statement of our energy in the water. Mr. Powelson's and mine is the same * * * the difference between Mr. Powelson's conclusions and our conclusions is the difference in the efficiency that we figured on as against the efficiency that he figures on, but the basic starting point, we are together" (R. 701).

Power Losses and Efficiencies

The only real disagreement between the witnesses for Petitioner and the witnesses for Respondent, on the matter of dependable power that could be produced by the development, was in the matter of the efficiency with which the installed machinery would operate and the losses that would be sustained in converting the potential power of running water into electric power.

In his calculations to determine the amount of dependable power that Respondent's developments would produce, Respondent gave consideration to eleven possible sources of loss. These sources and the estimated loss from each, stated in a percentage of the total potential power, (excluding that corresponding to water lost over the top of dams), are as follows:

(1) Losses of power in the water passages through which water is conducted from the reservoir to the water turbines ...	.89 %
(2) Loss of power in the passing of water through the turbines and the exit passages from the turbines into the river below the power house	7.10 %
(3) Loss of power in the electric generator	2.50 %

(4) Loss of power arising out of the necessity, due to changes in reservoir levels, for operating turbines at times under hydraulic heads different from the rated hydraulic head of the turbine	.40 %
(5) Loss of power arising out of evaporation from the reservoir areas	1.50 %
(6) Losses of power which might possibly be caused by a leakage of water through the flood gates	.224%
(7) Losses of power which might possibly be caused by a leakage of water through the rock foundations of the reservoir	.224%
(8) Losses of power represented by the power consumed for power station uses for lights, motors, etc.	.90 %
(9) Losses of power in transformers used to raise the voltage from that of the electric generators to the transmission line voltage	1.88 %
(10) Losses of power in the high voltage lines to collect the power from the four developments at a central point for delivery to the transmission lines	[Included in (9)]
(11) Losses of power incidental to increasing and diminishing the number of generating units in service	.330%

Res. Comm. Exs. R-300, R-300A, Tabs 27, 28, 29, offered R. 459; R. 244-245)

On the basis of the foregoing the total losses from all sources stated as a percentage of the said total potential power would be 15.[illegible] per cent. Losses under items (1) to (5) as listed above were taken into account in the course of making the log sheet calculations. The other types of loss

which could not properly be taken into consideration in those calculations were estimated separately.

There was no contention by Petitioner that any other specific source of loss should have been considered, nor was there any criticism of the amount of loss estimated by Respondent in respect to any item above, except item (2), dealing with turbine efficiency.

It is true that Mr. Waddell, an engineer testifying for Petitioner, insisted that after allowing for various specific types of loss listed, there should be another very substantial allowance for losses, the character of which he was able to identify only with the initials "G. O. K.", which he said meant "God only knows" (R. 702). Obviously, if an engineer who claims to be trained and experienced in the industry resorts to expedients of this kind, it is not surprising that Courts give little weight to the conclusions at which he arrives.

On the matter of turbine efficiency, Petitioner's witness, J. F. Roberts (Principal Mechanical Engineer in the Design Department of the Tennessee Valley Authority) took issue with Respondent's estimate of the power loss with respect to item (2), but he was compelled to admit that if under Respondent's plan of operation the turbines could be operated at all times between a minimum of 66 per cent and a maximum of 86 per cent of their full load capacity, then Respondent's estimate of that loss was correct (R. 634-635). Mr. Powelson had already testified that this requirement would present no difficulty in view of the large number and varying capacities of the generating units in the power houses (Comm. Tr. 1965-1966). This testimony was confirmed and its accuracy demonstrated to the Commission by Respondent's witness, Mr. Dimock, by the application of an interpolater chart to a typical load curve (R. 479-480). The testimony of Messrs. Powelson and Dimock in this respect was not controverted.

Petitioner's witnesses, Uhl, Ayres, Waddell, and Bowman made no claim to have made any calculations of the efficiency of the turbines. They merely assumed certain

percentages of efficiency for the purposes of their calculations. As shown above, Respondent assumed a turbine efficiency of 92.9 per cent and it appeared in the course of the testimony that the official Government tests of a 161-inch, 66,000 H. P. turbine, installed and in use at the Tennessee Valley Authority's Norris dam power house, showed an efficiency of 93 per cent in the range between 66 per cent and 86 per cent of full load capacity. It also appeared that the tests of a 38½-inch model wheel, homologous to the Norris wheel, made in the testing laboratory at Mt. Holyoke, Mass., showed an efficiency within the above range of 93.14 per cent, and that it was on the basis of this test that the Authority placed the order for its turbines at Norris Dam (R. 460-463, 469; Res. Comm. Exs. R-320, R-321, R-322, offered Comm. Tr. 2685).

The only loss not included above is that occasioned by the escape of water over the tops of the dams in the course of the operation of the development. Such loss in any months when it occurs is determined with accuracy by Respondent's log sheet calculations and, when stated as a percentage of the total potential power, amounts to about 5 per cent thereof (Res. Comm. Ex. R.-300A offered Comm. Tr. 2661; line 102).

The result of the entire detailed investigation is the conclusion that Respondent's property can develop 512,500,000 k.w.h. of super-primary power (Saluda type) at 35 per cent annual load factor, and can deliver a demand capacity of 167,200 k.w.

In contrast with the foregoing, consider the testimony of Petitioner's expert, Mr. Ayres. He assumed as a starting point 660,000,000 k.w.h. as the potential power from "all the water" (R. 683). This amount he reduced by 13 per cent to take care of turbine and generator losses (assuming a combined efficiency of 87 per cent as against Respondent's figure of 90 per cent). This leaves a balance of 574,200,000 k.w.h. per annum. From this Mr. Ayres insists on deducting another 144,200,000 k.w.h. or about 25 per cent for additional losses. This he says is based "on

his experience", but he gives no breakdown to show how the total is reached (R. 683-684).

It is perfectly plain, in view of the testimony of all the other experts, that a very large part of this additional loss must be assigned to loss of water over the dams in the course of carrying on the operation. There is no possible way for a witness, even though an expert, to have any accurate idea of losses of water over the dam unless he makes log sheet calculations similar to those of Respondent to determine just what losses of this type would be incurred over a substantial period of operation. This, Mr. Ayres made no pretense of having done. His estimate could have been nothing but a guess without underlying data upon which to base it. Again we remark, it is not to be wondered at that the tribunals below chose to accept the evidence of Respondent on this point.

What Will it Cost to Make the Development?

Turning now to the second important inquiry which an interested purchaser would have made with respect to Respondent's property, we find that Respondent relied principally upon the testimony of Mr. Chambers and Mr. Deutschbein as confirmed in certain respects by Mr. Creager. Petitioner offered before the Commissioners the testimony of Messrs. White, Uhl, Ayres, Bowman, and Waddell, all except Mr. Waddell being employees or ex-employees of the Tennessee Valley Authority.

There was a wide difference of opinion between Petitioner's witnesses and Respondent's witnesses as to the over-all cost of Respondent's development. That perhaps was to be expected, but it does seem remarkable that there was also a wide divergence of opinion among Petitioner's own witnesses as to this matter of cost, the highest estimate being practically 20 per cent more than the lowest estimate (R. 589, 666, 689, 698, 710). The explanation of this variation of opinion may lie in the fact that, with the exception of

Mr. White and Mr. Waddell, none of Petitioner's witnesses had had any actual experience in doing the things concerning which they were testifying. They were all theorists. None of them had been in the position of taking the responsibility for estimating the cost of a large hydro-electric development and risking his or his employer's resources on the accuracy of his estimates (R. 658-659, 680, 705-706). Even Mr. Waddell admitted that his actual experience in hydro-electric construction was limited to small projects—none costing much more than a million dollars (Comm. Tr. 5028).

On the other hand, Respondent's witness, Mr. Chambers, had for many years been Chief Engineer of the Foundation Company of New York, one of the largest engineering construction organizations in the world. He had estimated upon the cost of projects totaling more than five hundred million dollars and was in responsible charge of construction of the greater part of these projects. He had at his disposal the detailed cost records for many years on works constructed by the Foundation Company, totaling hundreds of millions of dollars (R. 168-169). Mr. Deutschbein was formerly the President of the Foundation Company and at the time of testifying was the President of a firm actively in the business of building engineering projects of great difficulty and then actually engaged in building a large hydro plant in the Penobscot River in Maine. What Respondent's witnesses lacked in number, they much more than made up in training and experience (R. 436-437).

Mr. Chambers prepared plans for Respondent's entire development, including designs for four dams and power houses and specifications as to machinery and equipment to be installed therein. These were in sufficient detail to enable a contractor to make a firm bid on the construction work. Mr. Chambers testified as to the over-all cost to build the dams and power houses and install the machinery and equipment (R. 174-176; Res. Comm. Ex. R-259, offered R. 174). Mr. Deutschbein testified as to the cost of building the dams and power house structures. He made no estimates on the machinery (R. 440).

In addition, Respondent offered testimony as to every other substantial item of cost, including highway relocation, employees' houses, additional reservoir lands, reservoir clearing, purchase or relocation of a line of railroad in the Murphy reservoir, cemetery relocation and acquisition of a small municipal hydro plant that would be flooded out by the Murphy dam (Comm. Tr. 1572-1585). On the most important of these items—cost of necessary highway relocation—Respondent offered the testimony of Mr. Plemmons, District Engineer of the North Carolina State Highway Commission, who, at the direction of his superior in the Commission, made a detailed estimate on the subject of the cost of necessary road relocations (R. 182-183).

There was no criticism of the dimensions of or quantities contained in Mr. Chambers' principal structures, though there was criticism of some auxiliary features of his plans, such as flumes and aprons. By reason of this criticism Mr. Chambers redesigned certain auxiliary features and reestimated their cost and submitted his revised estimates to the three-judge District Court (R. 834-837, Res. Comm. Ex. R-403, offered Comm. Tr. 5556; Res. Ct. Exs. R-1, R-2, offered Ct. Tr. 154-156). The fairness with which Mr. Chambers did his work is evidenced by the fact that in the opinion of several of Petitioner's experts, he unnecessarily included concrete cores in the earth dams at Murphy and Nottely, the elimination of which would result in the saving of about $1,350,000 (R. 584). He also based his calculations on a concrete mixture containing a substantially higher percentage of cement than that used by the Tennessee Valley Authority. By conforming to Tennessee Valley Authority standards, there would have been saved $400,000 (R-1014; Res. Comm. Ex. 403, supra). Several of Petitioner's witnesses accepted Mr. Chambers' estimates of quantities as correct and based their estimates thereon.

One criticism directed at the Chambers' estimate was that it did not allow enough for the excavation and foundations at the Powelson dam. Petitioner attempted to show

that in constructing its dam at that site, it had been found necessary to excavate to a much greater depth than Mr. Chambers had estimated to reach a sound rock foundation and that this would have greatly added to the estimated cost of Respondent's dam at this site. After repeated requests, Petitioner produced in Court the drill hole records of its extensive drilling in the bed of the river at that site and from these it appeared that sound rock foundations for a dam were reached at an average elevation of 1245.5 feet above sea level, whereas Mr. Chambers had estimated it would be necessary to excavate to an average elevation of 1241 feet above sea level (Res. Comm. Exs. R-365, R-368; offered Comm. Tr. 3516-3518).

It is difficult to compare the cost estimates of Petitioner's witnesses with those of Respondent. Mr. Waddell included in his estimate the value of the owner's property. Mr. Bowman merely adopted Mr. White's estimates and made none of his own, contenting himself with adding items to the White estimates (R. 709-710). In many instances the witness did not furnish sufficient data underlying his estimate to make it possible to make comparisons. Mr. Uhl adopted slightly different sites and elevations for some of his dams (R. 665-666). The really comparable estimates were those of Mr. White and Mr. Ayres on one hand, and Mr. Chambers and Mr. Deutschbein on the other. Mr. White admitted he made up his estimate in about a week, whereas Mr. Chambers worked several months on his (R. 171, 591).

It appeared that labor constitutes between 40 per cent and 50 per cent of the total cost of a project of this kind (Comm. Tr. 5545; R-743). Respondent offered testimony as to the price being paid various types of labor on exactly the same type of construction work at the time of the trial (R. 722-725). The labor prices used by Petitioner's witnesses were from 40 per cent to 80 per cent higher than those in actual effect on private hydro development projects under construction in the same general territory at that time (Comm. Tr. 5203). Dr. Morgan, Chairman of the

Tennessee Valley Authority, testified before a Congressional Committee that the Authority's rates for labor ran "seldom less than 50 per cent higher than at private dams, and from that up to more than 100 per cent higher" (R. 719-720). This alone accounts for more than four million dollars of the claimed additional cost for the construction of the project.

One of the principal points of difference between the witnesses was on the cost of installed machinery and appurtenances. Here it appears that in each instance Respondent's witnesses secured actual bids on the machinery from responsible manufacturers or dealers who stood ready to supply the article if the offer was accepted (R. 746). No Petitioner's witness testified that he went to this trouble to get accurate figures for machinery.

Petitioner's witnesses got much of their additional estimated cost by loading their estimates with all types of extravagant extras and in these additional items there was a wide difference of opinion between them. Mr. Bowman estimated that lawyer's fees on the project would amount to $400,000 and engineering fees to almost $2,500,000. (Comm. Tr. 5235-5236).

Mr. Bowman and Mr. Ayres allowed almost a million dollars to cover interest during the filling period after the completion of the construction work (R. 713). Mr. Waddell, Petitioner's witness, agreed with Respondent's witnesses that this was not necessary—that the reservoir could be allowed to fill as the work neared completion and that no substantial additional filling period need be considered (R. 699-700). Mr. Bowman attempted to justify his claim on the ground that a sudden cloudburst might destroy life and property and that this could only be guarded against by leaving the upper fifty feet in the Murphy and Nottely reservoirs unfilled with water until the construction work was completed (R. 714-716).

The greatest recorded flood on the Murphy dam site watershed for forty years prior to 1937 was only 23,000

c.f.s. for a 24-hour period, or 1,987 million cubic feet. The similar figure for the Nottely dam site watershed was 9,800 c.f.s. for 24 hours or 846 million cubic feet. This volume could be contained in the top 3 feet of the respective reservoirs (R. 402-403). Here was a million dollars of estimated cost plainly included without justification. Numerous illustrations of this kind might be given if space permitted.

It seems clear that Petitioner's experts on the subject of cost very largely destroyed the weight of their own testimony by the extravagance and unsoundness of their claims and that when compared with the estimates of the experienced witnesses who testified for Respondent, the Courts below did not hesitate to accept the latter.

It should be understood that in spite of all the care taken by Respondent's witnesses in making up their cost estimates, there undoubtedly was an element of uncertainty therein. In view, however, of the high degree of skill and care applied to the problem, the element of risk is reduced to a size and character ordinarily assumed by business men in enterprises of this magnitude. It is perfectly apparent that adding one million dollars or even five million dollars to the total over-all cost of Respondent's development does not at all destroy the value of Respondent's property for water power purposes. The value is still there, though it would not be so great. There does not seem to be any doubt that each of the tribunals below took this factor into consideration in fixing the amount of the award.

Testimony of Colonel Parker

Before passing from this subject Respondent desires to call the attention of the Court to the following statement from Petitioner's brief on reargument (pages 18-19):

> "As previously pointed out (Government's brief, pages 47-60), the overwhelming weight of the testimony establishes that the cost of production at Re-

spondent's proposed plants would have been a minimum of 9.5 mills instead of 3.75 mills per K.W.-hr."

No witness for the Petitioner so testified before the Commissioners or, indeed, gave any figure as to the cost of production of Respondent's power output. The sole authority for the above statement was Colonel Parker, Chief Engineer of the Tennessee Valley Authority. Petitioner seems to think that the District Court and the Circuit Court of Appeals should have given Colonel Parker's testimony "overwhelming weight".

Reference to the testimony itself makes it very plain why the tribunals did not do so. For one thing, the witness admitted that in testifying as to the cost of production of Respondent's power output he was guessing. In the record (pages 933-934) we find the following:

"Q. Did you assume, in your facts, on which you expressed your opinion, any cost of producing the power that could be produced by a private developer?

"A. I made a rough assumption; yes, sir.

"Q. Well, how rough was it, and what was the result?

"A. In view of the fact that the foundation conditions are so doubtful, it has to be just a guess, but my guess would be that the cost for this entire development, which you estimate at $30,000,000, the actual cost of doing that thing would be in excess of $50,000,000.

"Q. But you see, Colonel, that was not my question. You have given me the information, and I will let it stand. You guessed that the cost to build the project would be $50,000,000. My question was what did you guess would be the cost of producing power by these four developments?

"A. The cost of energy?

"Q. Yes, if you want to call it energy.

"A. At least 9 mills.

"Q. 9 mills?

"A. Yes; at the very least.

"Q. Well, don't stint yourself, Colonel. What would you say is reasonable, now, is 9 mills reasonable, or shall we make it 10 or 11.

"A. Oh, 9½, perhaps.

"Q. 9½, you say that is reasonable?

"A. That is the figure I actually made, but it has very little meaning.

"Q. What?

"A. It has very little meaning.

"Q. You mean your figure of 9½ mills has very little meaning?

"A. It might be materially higher if you did not have any rock under these dams.

"Q. Well, then, shall we say it is just a guess on your part?

"A. Certainly."

Again, it is apparent that Colonel Parker did not know the most elementary facts concerning Respondent's development. He attempted to justify an estimated cost of $50,000,000 for that development on the ground of the bad condition of the rock foundations for the dams and this without even knowing whether the dams to which he was referring were concrete or earth dams. On pages 950-952 of the record we find the following:

"Q. In making that statement as to the foundations being uncertain, did you include the Powelson site?

"A. I shouldn't; no, sir."

• • • • • •

"Q. You know, don't you, that it is intended to build the Murphy and Nottley plants as earth dams, and not concrete dams? Well, or didn't you know that?

"A. I haven't been able to find out just what was intended there."

• • • • • •

"Q. Do you say, as Chief Engineer of the TVA, that you need a rock foundation for an earth dam?

"A. No; but you need some earth."

• • • • • •

"Q. So we will eliminate that rock foundation, assuming that they are to be earth dams. Now, take the Appalachia foundation. Have you made any investigation there, and are you willing to say to this Court here, as Chief Engineer of the Tennessee Valley Authority, that the rock there is not strong enough to support a 110 foot high dam?

. . . . . .

"A. It can be put there, but it might not be done so easily, and it might run in excess of your estimate."

Again, Colonel Parker did not know what type of power Respondent's development was designed to produce, stating that the cost of production would be the same regardless of the type produced (R. 934-935).

A reading of Colonel Parker's testimony makes it very clear that this witness was entirely unfamiliar with the subject concerning which he testified. There is nothing overwhelming or even persuasive about his evidence.

Colonel Parker's testimony has value if that it further emphasizes the fact that Petitioner's experts, while in perfect accord in their conclusion that Respondent's estimates of cost were from 30% to 40% too low, failed entirely to agree in their items making up the total cost.

The net result was that whatever the defects considered, the result was always the same, in the estimation of Petitioner's witnesses, namely, that the true cost of construction was two-thirds more than Respondent's estimate. It is clear that neither the Commissioners nor the Courts above them were impressed by this teamwork of Petitioner's witnesses and their unanimity of opinion in respect of the cost to complete Respondent's developments, irrespective of the bevy of facts used by them to arrive at said opinion.

What Will Be the Over-All Cost to Own, Operate and Maintain the Enterprise After Development?

On this subject Respondent exercised the same care and skill used in considering other branches of the inquiry and presented to the tribunals below proof complete in every necessary detail to establish its contention that the annual over-all charge for operation and maintenance would vary from $1,900,000 to $2,150,000, according to the type of power. The breakdown of fixed charges and operating expenses included separate items for state, county and township taxes, malaria control, depreciation, expense of operation and maintenance, management and overhead, and interest on investment (Res. Comm. Ex. R-282, offered Comm. Tr. 1470).

Only two items in this list were criticised. It was claimed by Petitioner that the allowance for state, county and township taxes of $228,269.00 should be increased—Mr. Barker said the amount should be $420,155.00 and Mr. Hunt said it should be $521,710.00. Mr. Hunt contended that $309,375.00 of his estimate should be included for the land taxes in Cherokee County, N. C., and Union County, Ga. (Comm. Tr. 4060, 4240, 4259-4260). It appears that in 1937 the total amount of land taxes collected by these two counties was $168,000.00. (Comm. Tr. 4276). It was obviously unreasonable to assume that the governmental needs of these two counties would so greatly increase that one taxpayer therein, even though by far the largest taxpayer, would be called upon to pay almost twice the amount collected for all governmental purposes in 1937.

The other item criticised was the annual cost of development money. Respondent contended that 4½ per cent was ample to allow for this item and Respondent believes that in view of the very strong trend toward lower interest rates, this allowance is ample. Adding 1 per cent thereto, or 1½ per cent thereto, however, would not increase the annual charge sufficiently to deprive the enterprise of its attractiveness as a highly feasible development, though it

might reduce the price a prospective purchaser would pay for the property.

In connection with fixed charges and operating expense, there was considered the question of transmission line cost. Here there was a sharp conflict in testimony. Respondent offered as a witness Mr. Sindeband, for many years Chief Engineer of the American Gas and Electric Company in charge of its electric operations. He built hundreds of miles of high voltage lines, had an intimate knowledge of the character of the service and delivery to the customers from those lines, and had personally negotiated contracts with very large users of electric energy. He testified that it would cost .64 mills per k.w.h. to transmit power from the Powelson site to a customer one hundred miles away over a transmission line costing $19,000.00 per mile. He submitted a detailed estimate, including twenty-one different items, showing how he arrived at this cost (Comm. Tr. 5461-5463; Res. Comm. Ex. R-396, offered Comm. Tr. 5462; Res. Comm. Ex. R-398, offered Comm. Tr. 5463).

The petitioner relied chiefly on the testimony of Mr. Hapgood, one of its own employees without any practical experience in constructing transmission lines, except perhaps for the Tennessee Valley Authority, which maintains a scale of labor prices considerably higher than that in effect for private work throughout this territory. Mr. Hapgood was unable to produce any detail to support his cost estimate. He said—"I have nothing except the conventional estimates which are used in estimating things of this kind" (Comm. Tr. 4194). It appeared he had left these estimates in his office. His testimony was to the effect that it would cost from 1.2 to 1.4 mills per k.w.h. (Comm. Tr. 4141) to transmit power to a customer 100 miles from the Powelson development, and that the transmission line would cost $23,400.00 per mile (Comm. Tr. 4142, 4169). If he used, as he undoubtedly did, the T. V. A. scale of labor prices, that one item would account for a considerable percentage of the difference between his estimate and that of Mr. Sindeband.

The highly unreliable and misleading character of Mr. Hapgood's testimony is well illustrated by his estimate of the cost of stepping-up the electric current from the bus bar at the Powelson development (13,000 volts) to the transmission line there (161,000 volts). Respondent's estimates covering the cost of the dams, power houses, and machinery included transformers to step-up the current from 13,000 volts, as generated, to a transmission line voltage of 115,000 volts (Res. Comm. Ex. R-259, offered Comm. Tr. 1320). It appeared from the evidence that the cost of transformers to make the step-up from 13,000 volts to 161,000 volts would be very little more than the item already in the cost estimate (Comm. Tr. 5467). Instead of merely including in his transmission line estimate this slight excess of cost of one set of transformers over the other, Mr. Hapgood proposed to install a second set of transformers to raise the voltage from 115,000 volts to 161,000 volts and allowed for this item about $300,000, almost entirely an unnecessary expense and one which no practical developer of the property would ever incur. (Comm. Tr. 4195-4198).

Petitioner's witnesses Bowman, Uhl, and Waddell made estimates of transmission line costs, but these were not based on any underlying data and not one of the witnesses claimed to have made anything more than an unsupported estimate. There was a wide range of difference in these estimates—about 45 per cent (Comm. Tr. 4832, 5177, R. 703).

Certainly the tribunals below are not to be criticized if they chose to accept the supported detailed estimates of a highly experienced witness, instead of unsupported estimates of others without experience in the actual construction of transmission lines in private industry.

Is There a Market for Power? If So, at What Price?

Turning now to the fourth question requiring consideration by a prospective purchaser, namely, "Is there a market for the power so produced and, if so, what price could be

obtained therefor?"—attention is called to an admission contained in Petitioner's brief on reargument, Pages 23 and 24, as follows:

> "The Respondent has gone to great length to prove that there existed in the southeastern area a steadily expanding market for electric power. This has never been denied by the Government. * * * Everyone concedes that any power that might ultimately have been produced at these proposed plants could eventually have been absorbed in the market, but the question is—at what price?"

This confirms a statement made by Mr. Percy H. Thomas, Regional Director of the Second Administrative District of the Federal Power Commission having jurisdiction over southeastern states, including the territory where Respondent's development is located. Mr. Thomas testified (R. 414-415):

> "Chairman Mull: Do you know anything about the quantity it is claimed for the contemplated capacity that the Hiwassee River can produce, 67,000 kilowatts?
>
> "The Witness: I think so.
>
> "Chairman Mull: In your opinion, is there available demand, or contemplated demand by the year 1943 for that amount; daily demand, I mean?
>
> "The Witness: There is no doubt there is a demand for that amount, if there are ways found to get it to points of consumption, that is whether there are lines."

Mr. Thomas was particularly well qualified to testify with respect to this matter, having made a study in 1937 and 1938 of the power requirements of the four groups of large utilities occupying the territory over which he had jurisdiction, including a forecasting of the growth of their loads into the future and the determination of whether a shortage of installed capacity and a shortage of salable energy were to be expected. He predicted an energy shortage of

770,000,000 k.w.h. in 1939 and of about 2,000,000,000 k.w.h. in 1943 and a shortage of installed capacity of 400,000 k.w. in 1939 and 800,000 k.w. in 1943 (Res. Comm. Ex. R-212, Tab 7, offered Comm. Tr. 959; R. 412). In expressing the opinion that Respondent's power could be sold, Mr. Thomas, of course, took into consideration that the utilities occupying the territory on all sides of Respondent's planned development had extensive high voltage transmission lines, the nearest being about 16 miles from the Powelson dam site, and also that this dam site was near several important load centers, namely, Greenville, S. C., 104 miles; Atlanta, 97 miles; Chattanooga, 63 miles; Gadsden, Ala. 120 miles; and Knoxville, 60 miles (Comm. Tr. 5116).

In their reports to Congress for the years ending June 30th, 1935 and 1936, and in testifying before various Congressional Committees, the Directors of the Tennessee Valley Authority repeatedly stressed the fact that the demand for power in the Tennessee Valley area was rapidly increasing and would soon exceed the dependable supply (Res. Comm. Ex. R-214, offered R. 99; Res. Comm. Ex. R-215, offered R. 100; R. 99-102). As stated in their report to Congress for the year ending June 30, 1936 (Page 33) "there is every indication that the market for power will continue to grow steadily and that the problem in the Tennessee Valley region will not be to find a demand for power, but to produce the power to meet the demand" (Res. Comm. Ex. R-214, offered R. 99). Can it be doubted that any prospective purchaser for Respondent's property in January, 1936 would have been entirely satisfied that a market then existed for the power which that property could produce?

In view of the foregoing, we turn at once to the question—at what price could Respondent's power have been sold? It will be remembered that Respondent's testimony established the fact that it could produce Saluda type superprimary power at 35 per cent load factor at a cost of 3.75 mills per k.w.h. (Res. Comm. Ex. R-282, offered Comm. Tr. 1470).

In considering the question of the market price for power as applied to Respondent's developments, it should

be remembered that Respondent's Saluda type super primary power at 35% annual load factor is a product seldom, if ever, bought by the general public. It is bought or manufactured by utilities engaged in serving the public. These utilities ordinarily market their power at an annual load factor of about 50% to 55% as primary power, in substantially equal monthly deliveries of energy.

Most, if not all, of these large utilities could generate, with otherwise idle steam generating capacity, enormous quantities of secondary or non dependable power at a cost not exceeding 2 mills per k.w.h. (R. 1022). Non dependable power could also be generated at a less cost by the use of water which would otherwise be wasted over power dams.

By purchasing from Respondent Saluda type super primary power at 35% annual load factor, a utility could combine, with 7 k.w.h. of energy so purchased, 3 k.w.h. of non dependable power above referred to, to produce 10 k.w.h. of 50% annual load factor primary power for public consumption.*

The testimony of Mr. Powelson, as well as Petitioner's witnesses, Uhl and Ayers, was to the effect that 50% annual load factor primary power in 1936 had a market value in Respondent's territory of 5.5 mills per k.w.h., or 55 mills for 10 k.w.h. thereof (R. 494, 664, 766). Since the cost to the utility of 3 k.w.h. of non dependable power generated by it and used as above stated would not exceed 6 mills, there remain 49 mills representing the value of 7 k.w.h. of Respondent's Saluda type super primary power at 35% annual load factor, or 7 mills per k.w.h.

On the ratio of 7 to 3, used as above, utilities able to produce from waste water or idle steam capacity 224,000,000 k.w.h. per year of non dependable energy could profitably purchase the entire output from Respondent's developments. It appears from the testimony, without contradiction, that

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* If to 35 k.w.h. of Saluda type super primary power at 35% annual load factor there should be added 15 k.w.h. of non dependable power, a supply of 50 k.w.h. of dependable power at 50% annual load factor would be created. Thus, in that supply the proportion of dependable power to non dependable power would be as 35 k.w.h. to 15 k.w.h., or as 7 to 3.

Duke Power Co. alone had sufficient capacity in its steam plants, that would otherwise be idle, to generate every year not less than 800,000,000 k.w.h. of non dependable power (R. 1023).

Respondent offered in evidence copies of the contracts entered into in 1927 between Lexington Water Power Company (the only outstanding hydro-electric development in the territory supplying a super-primary power service) (R. 157) and Duke Power Company and Carolina Power & Light Company, whereunder it agreed to furnish to the last named companies for a *period of fifty years* a total of 300,000,000 k.w.h. per year at 35 per cent annual load factor, at an average price of 6.34 mills per k.w.h., delivered at the Saluda hydro development at transmission line voltage (115,000 volts) (Res. Comm. Ex. R-230, R-231, offered R. 122-123; R. 788; 790). Perhaps the most remarkable thing about these contracts is the fact that they obligate the Lexington Water Power Company for a 50-year period, an obligation that would never be undertaken by a producer of electric energy at a steam plant.

In a hydro-electric development the variables in the cost of production after the plant is installed are very small. On the other hand in a steam plant these variables, including coal, freight rates, and wages, are very great. The trend in the past years in the cost of the items mentioned has always been upward, and their cost cannot be estimated with certainty except for comparatively short periods of time. The owner of a steam plant can have no assurance that within a few years his cost of production will not be very materially increased. Under such conditions no steam plant owner would dare to contract to deliver electric power at a fixed price and in large quantities over a 50-year period of time. To do so would be to invite disaster.

A large utility needing super-primary power to combine with its own practically unsalable secondary power to thereby increase its supply of marketable primary power (and the evidence showed that in 1936 and for many years prior thereto, that was the position of many of the large utilities operating in the southeastern states) (R. 194-197)

might be very willing to contract for such power by hydro at a somewhat higher price than the then existing market price of the same type of power produced by steam if it could thereby assure itself for 50 years of a needed supply at a fixed price which it could afford to pay.

Petitioner has never contended that the contract price in the Lexington Water Power contracts did not represent the then fair market price of the power contracted to be sold under the conditions fixed by the contract. Indeed no one would believe that Duke Power Company and Carolina Power & Light Company contracted to pay more than a fair price for power purchased by them on a long time contract. The former was not only a large producer of power by steam and hydro, but also a large purchaser of power from other producers (Res. Comm. Ex. R-235, Tab 16, offered R. 131).

Faced with the foregoing facts Petitioner at the hearing before the three District Judges attempted to establish a claim that between the year 1927, when the Lexington Water Power contracts were executed, and 1936, when this proceeding was instituted, there had been "tremendous developments and tremendous improvements" in the art of steam power generation and the cost thereof had been so greatly reduced as to practically destroy the market for super-primary power produced by hydro and to make hydro-electric plants, as it were, a relic of the horse and buggy days (R. 856). This contention Petitioner again presses at some length before this Court in its brief on reargument (Pet. Br. on Rearg., page 22).

It there contends that the cost to generate in steam plants power of the type sold under the Saluda contracts was reduced from a cost in 1927 of "somewhere between 6 and 7 mills per K.W.-hr." to a cost of about 3 mills in the year 1936 (Pet. Br. on rearg., p. 22).

The improvements in the art of generating electricity by steam were great between the years 1914 and 1927 due to an increasing efficiency in the use of coal. However, said improvement in efficiency since 1927 has been extremely small, as will be apparent from the following

statistics which appear in the publication entitled "Federal Power Commission, National Power Survey, Interim Report, Power Series No. 1", dated 1935, and particularly the chart on page 20 thereof entitled "Trend in Fuel Consumption of Steam Generating Stations in the United States".

The following table shows in Col. 2 the B. T. U. consumed, according to the Federal Power Commission, at steam generating power stations in the United States per K.W.hr. from the years 1914 to 1934, inclusive. Col. 3 is Respondent's calculation arrived at by multiplying the figures in Col. 2 by 13,000 B. T. U.'s.

FEDERAL POWER COMMISSION STATISTICS

Years	*Pounds of Coal Having 13,000 B.T.U.'s Per Pound Consumed per K.W. Hr.*	*B.T.U.'s Consumed Per K. W. Hr. (Col. 2 x 13,000)*
1914	1.6	20,800
1915	1.56	20,280
1916	1.53	19,890
1917	1.52	19,760
1918	1.51	19,630
1919	1.51	19,630
1920	1.51	19,630
1921	1.5	19,500
1922	1.47	19,110
1923	1.4	18,200
1924	1.27	16,510
1925	1.15	14,950
1926	1.07	13,910
1927	1.02	13,250
1928	1.00	13,000
1929	1.00	13,000
1930	1.00	13,000
1931	1.00	13,000
1932	1.00	13,000
1933	1.00	13,000
1934	1.00	13,000

The Federal Power Commission's statistics quoted above show that there was a reduction, as we have stated, from 1.6 lbs. to 1.02 lbs. of coal per K.W. hour used between 1914 and 1927—a reduction of 36.3%. This is a very large reduction. After 1927, according to the Federal Power Commission, the consumption of coal per K.W. hour remained static.

In any market for power which can be served by both hydro and fuel burning plants, the market will always be served by that source or combination of sources which will produce the power required for public consumption at the lowest cost.

It is common knowledge that in the Southern States, where the majority of the generation is by run-of-the-river hydro electric plants, the power which the public consumes, —always *dependable* power,—is a combination of hydro and steam generated power.

Hydro plants alone, unless equipped with very large water storages, as at Respondent's developments, would be uneconomical unless aided by plants which could deliver to them super-primary power. Most of them have large quantities of non-dependable power available in varying amounts and at various times, depending upon the flow of the stream, but principally in the wet seasons of the year. This non-dependable power can be added to the owner's supply of dependable power and sold as such to the public, but only if there can be combined therewith a quantity of Saluda type super-primary power at the times, in the quantities, and at the rates of supply required to meet the public demand when the non-dependable power is not available, or not available in sufficient quantity. This combination greatly increases the amount of dependable power available for sale to meet public demand and gives value to large quantities of non-dependable power which would otherwise be practically worthless (R. 85-87). The public demand is ordinarily for power at annual load factors of about 50 per cent to 55 per cent (R. 102).

The needed super-primary power may be generated by steam and may also be furnished by hydro plants if equipped

with an enormous water storage as at Respondent's development (R. 85). A prospective purchaser of super-primary power would purchase from the source which he deemed most advantageous to himself.

In view of the record in this country of rising labor prices over a very long period of time and the fact that labor prices are controlling in the cost of coal at the mine mouth, in the freight rate to move it to the point of consumption, and in the cost of operation and maintenance of a steam electric plant, the owner of a steam plant can have no assurance that within a few years his cost of production will not be very materially increased. Under such conditions no steam plant owner would contract to deliver electric power at a fixed price and in large quantities over a long period of time, such as 50 or 99 years. The reason for this is that the business risk involved in a sale of that kind is much greater than a prudent business man would take in view of the past record of and the present trend in the price of labor, skilled and unskilled.

On the contrary in a hydro-electric development the variables in the cost of production after the plant is installed are very small, the water—"the white coal"—costing nothing, and the labor cost per k.w.h. produced being much lower than in the case of steam generation.

The producer of super-primary power by hydro has, therefore, an advantage over the producer by steam, in that he can offer his customer a contract covering a long period of time without incurring any substantial business risk. The longtime contract is of material advantage to the purchaser, since through it he secures protection against the effect of the rising cost of labor and assures himself of a needed supply of power for years to come at a fixed price which he can afford to pay.

The remaining question is the price which the steam and hydro producers of super-primary power would respectively ask for their product.

By the terms of the Lexington Water Power Company contract heretofore referred to (Page 38), each purchaser was required to take during each month not less than 2.78 per cent of the annual delivery of energy contracted for, but had the option of taking the balance of the energy whenever it desired, subject to the condition that the purchaser could not take in any calendar month more than 13.9 per cent of the annual delivery of energy. Thus the purchaser could, if he desired, take as much as 83.3 per cent of the energy purchased during any 6 months of the year—normally the 6 months of lowest water (R. 788).

Petitioner admits in its brief on reargument (Page 22) that in 1927 the cost of generation by steam, in the Duke Power Company area, of Saluda type super-primary power of 35 per cent annual load factor, was "somewhere between 6 and 7 mills per k.w.h.", but it insists that as of 1936 the cost of generating the same power by steam had fallen to 3 mills per k.w.h. This contention is made on the sole authority of the testimony of its witness Mr. Moreland, who was not produced as a witness until the hearing before the three District Judges. Petitioner asserts in its brief that Mr. Moreland's testimony "must be accepted, because, for all practical purposes, it is uncontradicted". This is a mistake.

The testimony had already been contradicted before it was given by Mr. Powelson before the Commissioners. He testified (R. 387) that the fair market price of power on the switchboard at Gorgas No. 2 of Alabama Power Company (a steam plant) at 35 per cent annual load factor with coal costing $4.00 a ton, would be about 7½ mills per k.w.h.

Mr. Moreland's testimony was contradicted by Respondent's witness Baumeister before the three-judge District Court. Mr. Baumeister went into the cost of generation of power by steam, measured on power house switchboard, in great detail, showing the several elements of cost and submitted to the Court Res. Court Exhibit R-14 (offered R. 984), containing a table from which the following is taken:

SWITCHBOARD COST TO GENERATE BY STEAM

Load Factor	*Total Cost per K.W. Hr.*
20%	11.213 mills
35.17%	7.213 "
50%	5.613 "
75%	4.348 "
100%	3.761 "

These estimates, as appears from Page 15 of said Exhibit R-14, are based upon coal costing $4.20 per ton, of which $2.86 is freight—the coal containing 14,000 b.t.u. per pound.

Mr. Moreland's testimony had already been contradicted before it was given by Petitioner's own witnesses, Mr. Uhl and Mr. Ayres, before the Commissioners.

Mr. Ayres said: (R. 694) "The cost of production of steam power would depend upon the load factor which you assumed, and 5 mills is, in my opinion, a proper figure to use for about 55 per cent load factor."

Mr. Uhl said (R. 664):

> "Q. Now, in your opinion, what could that, something over 50 per cent load factor power, what could it be produced for, according to your estimates by steam power plants in the Duke Power Company and the Georgia Power Company's territory?
>
> "A. About 5 mills per kilowatt-hour . . . ."

Mr. Powelson, cross examined by Mr. Fowler, testified (R. 766):

> "Q. Let me ask you this. What would be the cost of generating electricity per kilowatt (hour) by steam at 50 per cent load factor?
>
> "A. It would be about five and one-half mills.
>
> "Q. About five and one-half mills?
>
> "A. Yes.
>
> "Q. So we may assume you are in substantial agreement with Mr. Uhl on that point . . . ."

The following table compiled from the testimony of the witnesses Uhl, Ayres, Baumeister and Powelson shows them all to be in substantial accord:

Estimated Cost in Mills per K. W. Hr.

Load Factor	*Uhl*	*Ayres*	*Baumeister*	*Powelson*
20%	—	—	11.213	—
35.1%	—	—	7.213	7.5
50%	—	—	5.613	5.5
55%	5.00	5.00	—	—
75%	—	—	4.348	—
100%	—	—	3.761	—

The soundness of Mr. Baumeister's estimates is further confirmed by Petitioner's Court Exhibit P (offered Ct. Tr. 534; R. 1043; Appendix B hereto), a contract between the Tennessee Valley Authority and the Commonwealth & Southern Corporation, dated August 12, 1939, wherein the Authority agrees to sell dependable power at 100% load factor at the price of 3.6 mills per k.w.h. Mr. Baumeister's estimate is 3.761 mills (See Appendix C hereof, parts I, II and III, for proof of the cost per k.w.h. at which power is to be sold under the above contract. The load factor is not mentioned in the contract, but can be readily calculated from the terms thereof. See footnote on p. 48 post).

According to the Wholesale Power Rate Schedule A-1 of the Tennessee Valley Authority (Appendix D hereto), printed on Page 283 of its Annual Report for the year 1936 (Res. Comm. Ex. R-214, offered Comm. Tr. 965), its selling price for primary (dependable) power of 35 per cent annual load factor in the quantity of 512,500,000 k.w.h. per annum is $236,646.66 per month, or $2,839,759.00 per year. This is at the rate of 5.58 mills per k.w.h. and is for primary, not super-primary power (See Appendix E hereof for computation by which this price is found from the Schedule). Mr. Krug on cross examination stated that if a customer of Tennessee Valley Authority desired to buy Saluda type super primary power at 35 per cent annual load factor, the

Authority would find a way to furnish it at a price between 6 and 10 mills per k.w. hour (R. 973).

It thus appears that Mr. Moreland's testimony before the District Court as supplemented to some extent by Mr. Krug's testimony before that Court, is not only contradicted by the testimony of Respondent's witness Baumeister, but is contradicted by all the testimony of both Petitioner and Respondent on the same subject before the Commissioners, and by the Authority's Power Rate Schedules.

The fact is that after the award was made by the Commissioners, Petitioner evidently realized that its only hope of convincing the Court that Respondent's property did not possess substantial water power value, was to make a fight on the subject of the fair market price for super-primary power at 35 per cent annual load factor in the year 1936. To do this it was necessarily compelled to offer testimony flatly contradicting the testimony of its own witnesses before the Commissioners. Under the circumstances it is not to be wondered at that the attempt failed and that neither the District Court nor the Circuit Court of Appeals was willing to accept the testimony of Messrs. Moreland and Krug on the matter concerning which they testified.

In view of the fact that Petitioner seems to be staking its entire case before this Court on the testimony of the two witnesses just named, Respondent feels bound to ask the Court to indulge it while it comments as briefly as possible on some very significant features of the testimony of these two witnesses.

Testimony of Mr. Krug

Mr. Krug was presented to the District Court as the Chief Power Engineer of the Tennessee Valley Authority. Leave was secured to insert in the record a statement of his qualifications as an expert. Respondent had no opportunity to examine that statement until after Mr. Krug had completed his testimony. It discovered later that Mr. Krug was not the expert which Petitioner held him out to be.

His biographical sketch shows that he is not an engineer. He belongs to no engineering societies. He never worked for any employer engaged in the generation and sale of electric power for profit, and was never employed by anyone generating or selling electric power, except the Tennessee Valley Authority. At the time he testified he had been in the employ of the Authority for approximately a year and one-half, and at that time had been out of college nine years (R. 953-954).

Mr. Krug claimed that during his employment by the Tennessee Valley Authority he had become highly experienced in the sale of electric power and had negotiated contracts for the sale thereof, aggregating a billion kilowatt hours on an annual basis (R. 953-955). Many of these contracts were for the sale of power to municipalities who desired it for re-sale to the general public (R. 954). They had no interest in super-primary power, not being generators of non-dependable power, and dealings with them could have added nothing to Mr. Krug's knowledge of the fair market price of that special type of power.

Mr. Krug did negotiate two contracts for the sale of large blocks of power aggregating probably 550,000,000 k.w.h. per year. He referred to one of these contracts when asked if the Tennessee Valley Authority had ever sold super-primary power. It is a contract with the Arkansas Power & Light Company and was received in evidence as Petitioner's Court Exhibit Q (offered Ct. Tr. 534; R. 1045; Appendix F hereof).

It seems very strange that Mr. Krug mentioned this contract in connection with super-primary power. When the contract is examined, it appears that it is a contract to sell waste energy, which is defined therein as including only such energy as can be generated by means of equipment which would otherwise be idle and by the utilization of water which would otherwise be wasted over the dams. Under the contract the price for the non-dependable water power cannot exceed 1.5 mills per k.w.h. (See appendix F).

As further evidence of his experience, Mr. Krug offered the contract between Tennessee Valley Authority and Com-

monwealth & Southern Corporation, dated about one month before Mr. Krug testified, The average price under that contract for *hydro power is 3.1 mills* per k.w.h. (R. 955; see Appendix C, Part I). A careful examination of the contract discloses that the hydro power sold thereunder was non dependable secondary power, sold at 100 per cent load factor,* during the time it is supplied, and that the Authority was not bound to make deliveries under the contract, except during certain stated percentages of the time in each year, as selected by it, those percentages varying from 60 per cent to 75 per cent of the time. (See Appendix B, p. iii.)

The Commonwealth & Southern contract also gave the customer the right to supplement its purchases of hydro power with purchases of steam power to meet its needs when there was a deficiency in the supply of hydro power at 100 per cent load factor. The price charged for the steam power under the contract is 4.979 mills per k.w.h. for that purpose (See Appendix C, Part II). For additional steam power, energy, and capacity, the price varies from 5 mills to 7 mills per k.w.h. (See Appendix B, p. iii). This contract was made in August, 1939 (Pet. Ct. Ex. P., offered Ct. Tr. 534; R. 1043-1045) (See Appendix B).

It is impossible to reconcile the market price for steam power under this contract with Mr. Moreland's theory that, due to changing conditions, a fair market price for dependable steam power at 35 per cent annual load factor in 1936 was 3 mills per k.w.h., unless there had been between 1936 and 1939 such a tremendous increase in the cost to produce steam power, as to practically double the fair market price thereof.

We are at a loss to understand how Mr. Krug could seriously offer these contracts as evidence of experience in the sale of dependable power, which would make his opinion

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* The load factor is not described in the terms of the contract, but the dependable maximum demand guaranteed to the purchaser was limited to 50,000 k.w. The annual delivery was to be at the rate of 438,000,000 k.w.h. per year. If this last figure be divided by the number of hours in a year, namely, 8760, the result is 50,000 k.w.; thus the load factor under the contract is seen to be 100 per cent.

as to a fair market price for Saluda type super-primary (dependable) power of any value.

The reason Respondent dwells at such length on Mr. Krug's lack of experience is because he was presented to the Court as a great expert. Counsel for Petitioner, while Mr. Krug was testifying, said:

> "Now, here is a witness who has probably sold more power in this area than any other man in this country, and is more intimately familiar with the marketing picture here than any other witness we can secure" (Ct. Tr. 543).

If that is a fair estimate of Mr. Krug's experience and ability, then his conclusions might be entitled to considerable weight. Respondent contends that it is evident they are not. Although Mr. Krug had no hesitancy in expressing his opinion on the fair market price of the type of power contemplated by Respondent's development, he based his conclusion on "experience", and nowhere submitted, with one conspicuous exception hereinafter discussed, any factual data to support the conclusion expressed.

Even Mr. Krug's statements of conclusions are often vague and meaningless. Referring to the market price of Respondent's power output, Mr. Krug said:

> "I believe that at the 1936 level, the power at the Hiwassee sites, possibly, could have been sold at an average rate of about 3 mills per k.w.h. for primary power. That compares to our *experience* of selling power in large blocks at about 3 mills, and for the most part delivered" (R. 960).

Again discussing the same subject, Mr. Krug said:

> "I was referring to *ordinary* primary power. I don't believe the Saluda feature would have any substantial value to a major power company, for power taken at the Hiwassee site. I might say that I base that conclusion on our general *experience* that we have had with these companies, and that fact that it would have no value to them unless they *needed capacity*" (R. 960).

No engineer would ever have made these statements. They completely fail to take into account the matter of the load factor at which the power is sold. There is no such thing as "ordinary" primary power where the matter of price is at issue, for the price of power is always dependent on the load factor at which it is sold.

The reason for this is obvious. Power at 25 per cent load factor requires the use of four times as much electrical capacity and machinery as power at 100 per cent load factor. The lower the load factor, the more electrical capacity and machinery is required to furnish an equal quantity of energy. It follows that the lower the load factor, the higher the price.

Mr. Krug's later statement is meaningless in view of the fact that any purchaser, desiring Saluda type super-primary power, would need capacity (kilowatts), as much as he would need energy (kilowatt hours). Under the Lexington Water Power contracts above referred to, both of the customers, in acquiring the right to receive 130,000,000 k.w.h. per annum, acquired also the right to a demand capacity—42,750 k.w. in the case of Duke Power Company and 55,000 k.w. in the case of Carolina Power & Light Company, whose contract was slightly different.

There is probably nothing that better illustrates the entirely undependable character of Mr. Krug's testimony than his reply to an inquiry by counsel for the Authority as to how he arrived at a figure of five-tenths or six-tenths of a mill as the extra value of the Saluda privilege, meaning, of course, the privilege of the purchaser to purchase power as Saluda type power is sold. Mr. Krug stated:

> "My opinion in that regard is premised upon a hypothetical consideration of the alternate cost, and I haven't developed that in detail, but I have taken into account the general factors not considering what it might cost to get this feature in some other way" (R. 961).

This answer is plainly meaningless.

Mr. Krug, in his testimony, made to the Court an astounding statement and submitted Petitioner's Court Exhibit R (offered R. 962) to substantiate it. Petitioner, in its brief on reargument, particularly calls the attention of this Court to that exhibit. Respondent joins in this request that the exhibit be given special attention and, for the convenience of the Court, has reproduced the exhibit as Appendix G to its brief. The exhibit is designed to show that if Respondent's development had been in operation from 1921 to 1936 and the utilities in the five neighboring states of North Carolina, South Carolina, Georgia, Alabama, and Tennessee had combined as one customer to purchase during said period Respondent's power output in the form of Saluda type super-primary power at a 35 per cent annual load factor, they could have made very little use of the power so purchased (R. 962-964).

Mr. Krug's contention was that, under those conditions, the utilities could not have used more than 13 per cent of Respondent's output for super-primary power purposes; that they might have used 54 per cent thereof for fuel displacement; and that no use whatever could have been made of the remaining 33 per cent of the power contracted to be purchased.

The utter folly of this statement is evidenced by the fact that in 1927 two of the utilities in the above territory contracted to purchase, throughout a period of 50 years, 300,000,000 k.w.h. per year of exactly the same type of power Respondent's development would produce and at the average price Respondent claims it could have secured for its power (R. 122-127; Res. Comm. Exs. R-230, 231, offered R. 122-123; R. 788-790).

It appears from the testimony that these utilities were so glad to secure this super-primary power that they contracted for its purchase before the Saluda development was actually made and waited about three years thereafter for the first deliveries of the power therefrom (R. 788).

The folly of the statement is further evidenced by the fact that between 1921 and 1936 the annual power requirements of the neighboring utilities grew from 220,000,000 k.w.h. per month to 743,000,000 k.w.h. per month. This is an increase in requirements of 523,000,000 k.w.h. per month of dependable power. When these figures are compared with Respondent's dependable output of 42,666,666 k.w.h. per month, it is perfectly obvious that in the 15-year period covered by Mr. Krug's exhibit, there was an opportunity to absorb the output of many developments of the size and character of Respondent's, if they could have been found and developed (Pet. Ct, Ex. R, offered R. 962).

In view of the foregoing, it is entirely clear why the three-judge District Court and the Circuit Court of Appeals were unwilling to follow Mr. Krug in his claim that a fair market price for Respondent's power output was so low that its property could have no water power value.

Testimony of Mr. Moreland

Petitioner contends in its brief on reargument, Pages 21 and 22, that its witness, Mr. Edward L. Moreland, testified that "power equivalent to that proposed to be produced by Respondent", could be produced by Duke Power Company and Commonwealth & Southern on their own systems by steam plants, at a cost slightly in excess of 3 mills per k.w.h., and contends that, since this cost is less than Respondent's cost of production, namely 3.72 mills per k.w.h., the testimony, if accepted, destroys Respondent's case. By the expression "power equivalent to that proposed to be produced by Respondent", Respondent understands Petitioner to mean Saluda type super-primary power at 35 per cent annual load factor delivered at the point of generation at transmission line voltage.

As heretofore pointed out (Page 43), Mr. Moreland's testimony is not only contradicted by testimony of Respondent's witnesses, but is also contradicted by the testi-

mony of Petitioner's witnesses, Uhl and Ayres, before the Commissioners. Mr. Moreland's testimony, which centered around certain exhibits and estimates to show the cost of producing power by steam "equivalent to" that produced by Respondent's development, carries in itself the seeds of its own destruction. It is somewhat difficult to accurately analyze Mr. Moreland's testimony, because some of the important points in connection therewith were only brought out in the course of cross examination.

Mr. Moreland based his estimate of the cost of producing electric power by steam, which gave him a 3 mill per k.w.h. result, on the assumption that a utility in need of additional capacity would secure it by making an additional installation in a steam plant already in operation. He then estimated the investment required to make this additional installation (R. 861, 864). This is clearly an unfair basis upon which to proceed, since it leaves out of the underlying investment figure a fair proportion of the cost of the site and of the buildings and of needed facilities and equipment already in place at the time the additional capacity is installed. It is also an unsound basis upon which to proceed, because, in a rapidly expanding market, it is not reasonable to suppose that utilities could secure all of their needed additional capacity by installations of additional units in existing steam plants.

It appears that Duke Power Company, one of the utilities to which Mr. Moreland acted as "special advisor" and of whose "system characteristics" Petitioner tells us Mr. Moreland had "intimate knowledge", was in need of additional steam capacity at about the time this case was being tried before the District Court, and, instead of making installations of additional capacity in its existing steam plants —and it had several—was in the early stages of constructing a large new steam plant near Cliffside, S. C., not far from Greenville, S. C., a large power center. It would have been fairer for Mr. Moreland to have made his estimate on the basis of what Duke Power Company was actually doing, instead of what he claimed it would do. (Pet. Br. on Rearg. Pages 21 and 22; Res. Comm. Ex. R-235, Tab. 16, offered Comm. Tr. 1110)

This unfair basis upon which Mr. Moreland rested his estimate, is, however, merely an incidental weakness therein. It is open to far more serious criticisms.

Mr. Moreland refused to state the location of the plant in which he planned to install the additional capacity on which he was basing his estimate (R. 887). In fairness, for purposes of comparison with Respondent's development, it should have been located in the neighborhood of Greenville, S. C., a large power center, convenient to Respondent's development and where Duke Power Company was at the time actually engaged in building a large steam plant on Broad River. Mr. Moreland estimated 10.3 cents per million b.t.u. as the cost of coal for his plant (R. 887). Applying to this the accepted average for the number of b.t.u. in a pound of coal (namely, 13,000), we discover that Mr. Moreland made his estimate on the basis of coal costing $2.68 a ton delivered at the power house* (R. 981, 982, 999).

From the record it appears that in the neighborhood of Greenville, S. C. the freight rate on the coal in use by the steam plants there, coming from the Clinchfield and New River fields in Virginia and West Virginia, was $2.86 per ton, or an amount in excess of Mr. Moreland's estimate for the entire cost of coal delivered (R. 982). The only possible explanation is, that for the purpose of his estimate, Mr. Moreland located his installation at an undesignated point in very close proximity to a coal field and necessarily far removed from the power center to be served by Respondent, which is in a non-coal producing territory.

Also, Mr. Moreland in calculating his costs, stopped when he brought his power to the bus bar on the switchboard in the generating plant, where it would have a voltage of 13,000 volts. He compares this energy at that voltage with energy at Respondent's development after it had been stepped-up to a transmission line voltage (R. 879).

Petitioner, in its brief on reargument, contends that Mr. Moreland's testimony was to the effect that power of

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* 1 ton = 2000 lbs. B.T.U. in 1 ton = 2000 lbs. × 13,000 B.T.U. = 26 million B.T.U. Cost of 26 million B.T.U. @ 10.3 cents per million = 26 × 10.3 cents = 268 cents.

the characteristics of Respondent's Saluda type power could be produced by steam at a cost of 3 mills per k.w.h. As a matter of fact, when Mr. Moreland's testimony, and particularly his cross examination, is carefully examined, it will be discovered that the cost of steam power as a substitute for Respondent's Saluda type power is estimated by him at 4.59 mills per k.w.h. (R. 863). He states that this last price is what the Saluda type power at 35 per cent annual load factor would cost if the unit generating it was operating at a 35 per cent annual load factor and no secondary or non-dependable power was being generated from the same unit.

In order to reduce the cost of the 35 per cent annual load factor Saluda type power, Mr. Moreland proposes to dispose of this secondary power. A simple calculation will show that it will require the sale, at a profit of substantially .856 mills per k.w.h., of all of the remaining 65 per cent of the energy which the unit is capable of producing if operated at full capacity all of the time to reduce the cost of the super-primary power produced by that unit from 4.59 mills per k.w.h. to 3 mills per k.w.h.* This sale is impossible.

To produce this additional non-dependable power the utility would be required to purchase coal from which the power is produced, in addition to that which would be purchased in producing the super-primary power. The testimony shows that this cost of coal would amount to approximately 1.77 mills per k.w.h. for a 100 per cent load factor operation (Res. Ct. Ex. R-14, p. after p. 16, offered Ct. Tr. 140). The testimony also shows that utilities in this terri-

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* Alleged cost to generate 35 k.w.h. at 35 per cent annual load factor at 4.59 mills ..... 160.65 mills
Less profit on sale of 65 k.w. at .856 mills per k.w.h. ..... 55.65 "

Alleged net cost to generate 35 k.w.h. at 35 per cent annual load factor ..... 105.00 "
Alleged net cost per k.w.h. to generate at 35 per cent load factor ..... 3.00 "

tory have large quantities of non-dependable power generally unsalable, which they are glad to sell at 2 mills per k.w.h. (R. 1022). It follows that it would be impossible for any utility, even though it could find a market for all of the non-dependable power from the unit referred to above, to sell it at a profit of .856 mills per k.w.h.

As a matter of fact, considering Mr. Moreland's testimony in the light of all the remaining testimony in the record on the same subject, it is rather apparent that if his estimate of 4.59 mills per k.w.h. is revised so as to include the cost of stepping-up the power to transmission line voltage, and if his estimate of the cost of coal is revised to a price that fairly represents the market price of coal in the territory where the power is to be marketed, and if his investment is revised on the basis of the construction cost of a new steam plant, he would arrive at a result entirely in line with the results reached by the other witnesses and confirmed by the Lexington Water Power contracts.

Additional Considerations to Which a Prospective Purchaser Would Give Weight

In addition to all of the foregoing, there are certain other facts appearing in the record to which a prospective purchaser for Respondent's property would undoubtedly have given weight. Many of these facts are connected with the history of the development.

The original incorporators of Carolina-Tennessee Power Company (to which Southern States Power Company was the successor by merger in 1929), enjoyed under the terms of their legislative charter the right to develop hydro electric power on all streams in North Carolina "not declared by law to be navigable", except in Swain and Graham Counties. With a wide choice open to them they chose the Hiwassee River in Cherokee and Clay Counties, North Carolina, as the scene of their activities.

Almost immediately they secured the services of an experienced engineer and a large field force and invested

a substantial sum in extensive surveying and topographical work on the river. The engineers located two dam sites, one substantially at the Appalachia dam site of Respondent; the other about 2½ miles above Respondent's Powelson site, and recommended the erection of a dam 150 feet in height at each site. They made detailed surveys and topographical maps of the reservoirs that would be created by the two dams.

A little later the Power Company began the acquisition of lands necessary for the development of the river in accordance with this plan and by 1913 had acquired the two dam sites and a considerable portion of the land necessary for the development. They believed that the property possessed water power value and invested money on the faith of that belief.

In 1913, Mr. W. V. N. Powelson, assignee of the Respondent Southern States Power Company, and President thereof, had just completed the development of a hydro electric project on the Nolichucky River, at Greenville, Tennessee, as chief engineer and contractor. He became interested in the Hiwassee River project and after thoroughly examining it, secured some banking associates and purchased all of stock and outstanding bonds of Carolina-Tennessee Power Company. Since that date Mr. Powelson and his associates have invested more than a million dollars in the property, in surveying and topographical work, engineering investigations, acquisition of lands, establishing their prior right of development through litigation, and in conducting the elaborate research described above necessary in order to perfect a plan for the most advantageous development of the property. Mr. Powelson in addition has invested many years of engineering and managerial effort in the enterprise with not a cent of compensation.

These owners quite evidently have had through the years a firm belief in the fact that this property possesses water power value, otherwise they would never have continued to increase their investment of time and money in the enter-

prise in the face of all of the obstacles and adverse conditions with which they have had to contend.

The first of these obstacles was litigation begun in 1914 and lasting for ten years, in which another power company, Hiwassee River Power Company, sought to establish its contention that it possessed the prior right to develop Hiwassee River in Cherokee County for hydro electric purposes. This litigation was difficult, long and expensive. Plainly both of the litigants felt confident that the property had substantial water power value, otherwise the prior right of development for which they were contending would not have been worth the expense of the litigation. Between 1923, when the end of the litigation was in sight, and 1929, when economic conditions made progress in development for the time being impossible, Southern States Power Company acquired more than 18,000 acres of land needed for the development and did much surveying and engineering work.

These facts plainly demonstrate that men necessarily familiar with the factors involved were willing to invest their time and money over a long period of years in this enterprise.* That fact undoubtedly would have been very persuasive in convincing a prospective purchaser that the property did possess water power value.

He would be confirmed in his opinion from another source. For many years the War Department, through its corps of Engineers, investigated the water power possibilities of the Tennessee River and its tributaries. Under date of Dec. 15, 1928, it issued a report on the major power producing tributaries of the Tennessee River, showing actual or tentative locations of navigation dams and hydro electric power sites. Its report shows on the Hiwassee River four power sites, namely, the Appalachia site hereto-

* Respondent's inactivity between 1930 and 1935 is not significant. The evidence is that there was no new hydroelectric construction throughout the Southeastern territory during those years (Res. Comm. Ex. 216, offered Comm. Tr. 972; Comm. Tr. 973).

fore referred to, the Coleman site (about 5 miles above the Powelson site), the Murphy site as adopted by Respondent, and a site still farther up the river.

In a report to the 67th Congress Second Session, from the Chief of Engineers of the U. S. Army, the following statement occurs: "The Hiwassee River is a very important power stream, of which the Ocoee is a tributary." The Ocoee has already been largely developed by one of the large utilities (R. 1056).

Respondent's witness, Mr. Bevan, a hydraulic engineer of wide knowledge and experience, in answer to an inquiry on cross examination, said "We have always recognized the Hiwassee River as one of the better power rivers in the East" (R. 505).

And finally, a prospective purchaser would have given weight—probably great weight—to certain factors of a general nature of which he would have become increasingly aware as his investigation of the property progressed. Here is a property possessing unusual advantages for hydro-electric development—heavy stream flow, great hydraulic head, strong non-soluble rock underlying the river, narrow damsites with high steep banks, and tremendous storage capacity in the wide valleys above the upper damsites.

This property is located in the center of a territory served by several large utilities possessing ample high tension transmission line facilities, and is within 100 miles of several of the important power centers in the southeast. All of these utilities have for years pursued a policy of developing hydro sites to furnish a large part of the power needed to supply their customers. The commercial feasibility of the production of electric power by hydro in the territory has been abundantly demonstrated by their acts and policies.

The market for power to be served by these utilities is rapidly expanding, so much so that soon the problem will be to find sufficient power to meet public needs.

All of this would lead a purchaser to confidently expect that careful investigation would confirm what seemed almost self-evident, namely, that the development of Respondent's property for hydro-electric purposes is commercially feasible.

In the face of this great mass of testimony covering so completely every phase of the question under consideration and amply supported on all points by authoritative basic factual data, each of the tribunals below inevitably came to the conclusion that the existence of water power value in Respondent's property was fully established.

ARGUMENT

The contention of Petitioner in its brief on reargument may be outlined as follows:

I

Under Section 25 of the Tennessee Valley Authority Act, the Circuit Court of Appeals should have reviewed the evidence and made its award without giving presumptive weight to the findings of the lower Court.

A. The scope of review of the Supreme Court is coextensive with the scope of review of the Circuit Court of Appeals; i. e., the Supreme Court can direct such disposition of the case as the Circuit Court of Appeals might have made.

II

Even under the interpretation of Section 25 of the Act adopted by the Circuit Court of Appeals, the findings and award of the District Court were not entitled to presumptive weight in the Circuit Court of Appeals, and the awards of those Courts are not entitled to presumptive weight here, because:

A. The conclusions of the Courts below are based on mixed findings of law and fact.

B. The findings as to market value are based on erroneous principles of law, namely:

(1) Misconception of prices paid by the Government for other lands.

(2) Receiving testimony as to the capitalized earnings of respondent's project as evidence of market value.

(3) Considering value of the property to the condemnor.

C. The conclusion of the Court that the property had water power value is contrary to the evidence.

These contentions will be discussed in the order set out.

I

The contention that under Section 25 of the Tennessee Valley Authority Act the Circuit Court of Appeals should have reviewed the evidence and made its award without giving presumptive weight to the findings of the lower Court.

In our former brief (pages 114-118) we discussed this contention and the authorities cited in Petitioner's brief on reargument, including the case of *Welch* v. *Tennessee Valley Authority*, 108 Fed. (2) 95, in which this Court refused to grant certiorari. In the *Welch* case the Court placed an interpretation on Section 25 of the Act in entire harmony with the interpretation placed thereon by the Circuit Court of Appeals in this case. This interpretation by the Circuit Court of Appeals of the Sixth Circuit was not only agreeable to, but was insisted upon, by Petitioner herein. In its brief in opposition to certiorari in the *Welch* case, Petitioner herein said:

> "On appeal by petifioners to the Circuit Court of Appeals for the Sixth Circuit that Court *affirmed* the

decree of the District Court." (Respondent's brief, p. 3) (Emphasis supplied)

Also

> "While the reasonable construction of this language (of Section 25 of the Tennessee Valley Authority Act) would appear to be that the Circuit Court of Appeals is to review the evidence and exercise its own independent judgment in arriving at a final valuation, it seems unreasonable to suppose that Congress intended to impose a mandatory requirement that the appellate court shut its eyes to all prior proceedings or that the statute requires consideration of the printed evidence entirely disassociated from the prior proceedings in the case." (Brief pp. 8-9)

We can add nothing to what this Petitioner there said.

It is apparent that the Circuit Court of Appeals in this case did what the Petitioner here in its brief on reargument (page 5) says was done in the *Welch* case by the Circuit Court of Appeals in the Sixth Circuit, that is, reviewed the weight of the evidence and made its own determination on the question of value.

At the request of the Court we have reviewed the legislative history of the Tennessee Valley Authority Act.*

If anything is to be gathered from this history, it is the fact that members of Congress who were interested in the subject of condemnation proceedings under the Act, conferred with the Department of Justice and learned that the Government had at times been forced to pay an excessive award when the amount thereof was determined by a jury. With the idea of protecting the Government in this respect, Section 25 was framed so as to provide for a commission, and subsequent consideration of the amount of the award by three district judges and three judges of the Circuit Court of Appeals. This would make it certain that at least

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* For the convenience of the Court we have printed the details of this legislative history in Appendix A, infra p. i.

six federal judges would consider the testimony and take part in the making of the award. It was felt in Congress that this would give the Government ample protection from excessive awards.

A. The Contention That the Scope of Review of the Supreme Court is Co-extensive With the Scope of Review in the Circuit Court of Appeals, i. e., the Supreme Court Can Direct Such Disposition of the Case as the Circuit Court of Appeals Might Have Made.

Up to this time, through all of the Courts, Respondent has carried successfully the burden of establishing, by the greater weight of the evidence, that the property in question had water power value; and it is confident that it could carry that burden in this Court. It is Respondent's view, however, that such a review of the case in this Court, as that for which Petitioner contends, would not be in harmony with the provisions of Section 25 of the Act, nor with the applicable principles of law with respect to the appellate practice of this Court.

We have here a unique situation in which the Circuit Court of Appeals, to all intents and purposes, is made an appraisal board.

Petitioner predicates its contention, as we understand, on the statement sometimes used by this Court that when a writ of certiorari has been granted, this Court has the power "to review the action of the Court of Appeals and direct such disposition of the case as that Court might have made of it upon the appeal from the District Court".

That is unquestionably the law when properly applied. It should be noted, however, that this Court in making use of the quoted expression was speaking of those cases in which the Circuit Court of Appeals was considering an *appeal* from the District Court. Every case cited by Petitioner in its brief on reargument in support of this contention (pp. 5-6) was a case in which that situation existed. *Story Parchment Co.* v. *Patterson Paper Co.*, 282 U. S. 555 (567), 75 L. Ed. 544 (551), and cases cited.

In the instant case the Circuit Court of Appeals was not sitting as an appellate court, but as a fact-finding body. *United States* v. *Reynolds*, 115 Fed. (2) 294 (296). Hence, the quoted language has no application. It has reference to cases in which the function of this Court was the same as the function of the Circuit Court of Appeals when sitting as an appellate court.

The situation here is analogous to that which exists when the Circuit Court of Appeals reviews for error an appeal to it from a district court in an action at law. There is nothing in the Act or its history to indicate that it was the intention of Congress to burden this Court as it would be burdened if Petitioner's contention in this respect should prevail.

A condemnation proceeding is an action at law. *Kohl* v. *United States*, 91 U. S. 379, 23 L. Ed. 449; *Metropolitan Railroad* v. *MacFarland*, 195 U. S. 322, 49 L. Ed. 219; *United States* v. *Jones*, 109 U. S. 513, 27 L. Ed. 1015; *Hecker* v. *Fowler*, 69 U. S. 123, 17 L. Ed. 761.

This Court in the *MacFarland* case said:

> "That a proceeding involving the exercise of the power of eminent domain is essentially but the assertion of a right legal in its nature has been determined. So, also, the decisions of this Court have settled that a condemnation proceeding initiated before a court, conducted under its supervision, with power to review and set aside the verdict of the jury, and with the right of review vested in an appellate tribunal, is, in its nature, an action at law."

In the *Hecker* case above referred to, this Court pointed out that:

> "Subordinate tribunals must ascertain the facts upon which the judgment or opinion excepted to is founded for the reason that this Court cannot determine in cases at common law the weight or effect of evidence nor decide mixed questions of law and fact."

It would appear, therefore, that in the instant case the function of this Court is limited to a review of the record for error.

Even in cases in equity or in admiralty where the scope of appellate review of questions of fact is not limited as it is in actions at law, this Court will ordinarily accept the concurrent findings of both courts below as establishing the facts found. *United States* v. *O'Donnell*, 303 U. S. 501, 82 L. Ed. 980; *Pick Mfg. Co.* v. *General Motors Corp.*, 299 U. S. 3, 81 L. Ed. 4; *Continental Illinois Bank & Trust Co.* v. *Chicago, R. I. & P. R. Co.*, 294 U. S. 648, 79 L. Ed. 1110.

None of the cases cited by appellant involve the question of the power of this Court or of the Circuit Court of Appeals to review findings of fact made by the trial court. And, as the cases previously cited establish, ordinarily neither this Court nor the Circuit Court of Appeals has the power to review findings of fact made by the trial court in eminent domain proceedings. By virtue of Section 25 of the Tennessee Valley Authority Act, the Circuit Court of Appeals is expressly clothed with this power in this case, but the Tennessee Valley Authority Act did not go further and provide for a new trial of the facts in this Court. Out of an abundance of caution and in order to protect the Government from too generous jury awards in condemnation proceedings, the Act, in effect, constitutes the Federal District Courts and the Federal Circuit Courts of Appeal commissioners with power to make new findings of fact. But, after providing for a consideration of the evidence and for findings of fact by the three tribunals below, it was manifestly not intended that this Court again perform the functions and duties of commissioners. It is submitted that this Court does not sit as a trial court, but as an appellate court exercising the functions ordinarily exercised by an appellate court, that is, a review of the record for error of law.

II

The contention that even under the provisions of Section 25 of the Act as construed by the Circuit Court of Appeals the findings and award of the District Court are not entitled to presumptive weight in the Circuit Court of Appeals and the awards of those courts are not entitled to presumptive weight here, because:

A. The Conclusions of the Courts Below Are Based on Mixed Findings of Law and Fact.

The findings here are not mixed findings of law and fact. The only question of law involved was that of the competency of the evidence upon which the award was entered. In such case, the only question for the consideration of the appellate court is whether the evidence is competent.

The cases cited by Petitioner in its brief on reargument (pages 8-9) will be found, on examination, to be cases in which it was necessary for the court to reach a conclusion on primary or evidentiary facts, and then arrive at its ultimate finding by deciding the question of law in connection with the facts so found.

In *Helvering* v. *Texas-Penn Oil Co.*, 300 U. S. 481 (491), 81 L. Ed. 755 (762) the ultimate question was the liability of a tax payer for certain taxes. In addition to finding the underlying facts, it was necessary for the court to determine, as a matter of law under the applicable statute, whether the tax payer was liable. In that case the court, in discussing what was meant by mixed findings of law and fact, said:

> "The ultimate finding is a conclusion of law or at least a determination of a mixed question of law and fact. It is to be distinguished from the finding of primary, evidentiary or circumstantial facts."

In *United States* v. *Appalachian Power Co.*, 311 U. S. 377, cited by Petitioner, this Court was careful to point

out that the facts and their constitutional significance made the question for final determination a mixed question of law and fact.

B. The Findings as to Market Value Are Based on Erroneous Principles of Law.

The Petitioner under this heading urges three alleged errors, as follows:

1. The use it claims was made by the District Court of testimony as to prices paid by the Tennessee Valley Authority for other lands in the development.
2. The alleged erroneous consideration of the capitalized earnings of Respondent's project as a basis for determining market value.
3. The alleged theory of the Circuit Court of Appeals that the value of the property to the condemnor should be considered.

In discussing the first of these alleged errors, Petitioner in its brief on reargument dwells largely on the use claimed to have been made by the District Court of the evidence referred to. In view of the fact that the Circuit Court of Appeals heard the whole case on the record and reached its own conclusions and made a new award, it would seem that use of the testimony by the District Court, even if improper, would not constitute reversible error on the hearing in this Court in which it is the findings and award made by the Circuit Court of Appeals which is the matter being reviewed.

Petitioner does contend that the Circuit Court of Appeals adopted the finding of the District Court complained of, but an examination of the opinion of the Circuit Court of Appeals shows that this contention cannot be sustained. The latter Court says:

> "There is no certain testimony in the record which would justify us in adopting a higher valuation than that fixed by the Court, just as there is no testimony upon which we would feel justified in fixing the valu-

> ation at a lower figure. We do not mean to say, of course, that the prices paid for other land acquired for the project furnishes any conclusive standard for the valuation of the lands of respondent. Neither does the investment made by respondent in its property. These are to be considered, however, along with the proof of the availability of the property for the development of water power and the estimates of value placed thereon by the experts."

From this it seems clear that the Circuit Court of Appeals reviewed all of the testimony in the record. Since Petitioner itself offered the testimony as to prices paid for other lands, it certainly cannot complain if the Circuit Court of Appeals considered it along with the remainder of the testimony in the record. The award of the Circuit Court of Appeals was plainly the result of a weighing of all the testimony.

In this connection, the following from the opinion in *Shoemaker* v. *United States*, 147 U. S. 282 (305), 37 L. Ed. 170 (187), is in point:—

> "The court cannot bring into review before it the various sources and grounds of judgment upon which the appraisers have proceeded. The attempt to do so would transfer the function of finding the values of the lands from the appraisers to the court. Such a course would have presented a much more serious allegation of error than we find in the objection as made. The rule on this subject is so well settled that we shall content ourselves with repeating an apt quotation from Mills on "Eminent Domain", 246, made in the opinion of the court below: 'An appellate court will not interfere with the report of commissioners to correct the amount of damages except in cases of gross error, showing prejudice or corruption. The commissioners hear the evidence and frequently make their principal evidence out of a view of the premises, and this evidence cannot be carried up so as to correct the report as being against the weight of evidence. Hence, for an error in the judgment of commissioners in arriving at the amount of damages, there can be no correction, especially where the evi-

> dence is conflicting. Commissioners are not bound by the opinions of experts or by the apparent weight of evidence, but may give their own conclusion.' "

In considering the expression "prices paid for other lands", as used by Petitioner, it should be remembered that in every instance these prices represented the considered judgment of the Petitioner arrived at after full appraisal and investigation and before entering into negotiations with the owner as to the fair market value of the land in question. (Pet. Comm. Ex. 3-L, offered Comm. Tr. 4630; R. 642, 796) This matter is further discussed in Respondent's brief heretofore filed, Pages 85-87.

Petitioner is in error in claiming that the Circuit Court of Appeals considered the capitalized earnings of Respondent's project as a basis for determining the market value of Respondent's property. In its opinion the Court said:—

> "The peculiar difficulty of the case arises out of the fact that neither the expert testimony relied upon by Respondent, nor that relied upon by Petitioner, can be accepted in its entirety in fixing values, and the other opinion evidence as to value ignores very largely the availability of the property for water power purposes. Under such circumstances, the duty devolved upon the Court of determining the true value as best it could from the facts before it * * * The Court was not bound to accept the opinion of any of the experts or other witnesses as to value, but was charged with the duty of determining that question from all of the testimony considered in the light of the Court's general knowledge." (R. 1078)

As appears from the discussion of the evidence contained in this brief, Respondent's theory of the case was that a prospective purchaser, considering Respondent's property for water power purposes, would, of course, be interested in knowing about what investment it would have to make in order to develop the property. That information Respondent was in a position to give and gave to the Court. It was merely one of the indicia that Respondent's property pos-

sessed water power value and to some extent an element from which that value could be estimated. It was never contended by Respondent that the value of its property should be ascertained by determining the net annual profit from the operation of the development and capitalizing that figure. As a matter of fact, the award made in this case amounts to a very small per cent of the award that might have been made if the Court had adopted Respondent's estimates and applied the method last mentioned. (See Petitioner's brief heretofore filed, Pages 80-85 for discussion of another aspect of this point.)

Respondent is at a loss to understand Petitioner's contention that the Circuit Court of Appeals, in arriving at its award, considered the value of the property condemned to the condemnor. There is nothing in its opinion to warrant any such conclusion. It is true the whole inquiry was directed toward determining the value of the property for water power purposes and that was one purpose for which Petitioner desired the property. Another purpose in the mind of the Petitioner was stated to be flood control. The Circuit Court of Appeals certainly gave no thought as to the value of the property taken for flood control purposes. The fact that one use contemplated by the condemnor was a use to which the property was best adapted and a use to which it could have been put by the owner and by many others beside the condemnor cannot make the consideration of the value of the property for that use improper. (*Boom Co.* vs. *Patterson*, 98 U. S. 403, 25 L. Ed. 206. See also *United States* vs. *Chandler-Dunbar W. P. Co.*, 229 U. S. 53, 76-77, 57 L. Ed. 1063, 1081).

C. The Conclusion of the Court That the Property Had Water Power Value is Contrary to the Evidence.

This subject is fully discussed heretofore, pages 2 to 60.

Was the Evidence Complained of Incompetent?

In addition to discussing the questions of law urged by Petitioner in its brief on reargument, Respondent desires to refer briefly to one or two of the alleged errors committed by the Circuit Court of Appeals which Petitioner urges most strongly in its main brief.

In this connection Respondent would point out that in developing its proof in the courts below, it followed a method sanctioned and approved as entirely proper by the decisions of this Court and other courts.

It is held as law that when no actual current market exists, market value is still the standard, but it must be determined otherwise than by current market price. It must be estimated. This principle is particularly applicable in condemnation of real estate or of an interest therein. *Olson* v. *United States*, 292 U. S. 246, 78 L. Ed. 1236; *McCandless* v. *United States*, 298 U. S. 342, 80 L. Ed. 1205; *Ford Hydro-Electric Co.* v. *Neely*, 13 Fed. (2) 361; *New York* v. *Sage*, 239 U. S. 57, 60 L. Ed. 143.

The way to *otherwise* determine such market value is plainly indicated by the Supreme Court in the *Olson* case, supra (see page 4 ante).

We contend, and we do not understand that it is seriously questioned, that property of the character condemned herein is not "currently bought or sold to such an extent as to establish prevailing prices at or as of the time of the expropriation."

In *Ranck* v. *City of Cedar Rapids (Iowa)*, 111 N. W. 1027, the controlling principle was enunciated in the following language: (P. 1028)

> "Generally speaking the true rule seems to be to permit the proof of all the various elements of value; it is all the facts which the owner would properly and naturally press upon the attention of a buyer to whom he is negotiating a sale and all other facts which would naturally influence a person of ordinary prudence desiring to purchase."

The New York Supreme Court announced the same principle in *Brainard* v. *State*, 74 Misc. 100 (113), in the following language:—

> "It is a matter that must be left to the judgment of the court, but it may be safely asserted that no element should be excluded in arriving at the market value of premises which it is customary for the business world to consider in determining such market value, and which an ordinarily prudent man would take into account before forming a judgment as to the market value of property which he is about to purchase."

The Supreme Court in the *Olson* case, further pointed out (P. 255) that the owner's compensation does not depend upon the uses to which he has devoted his land, but it is to be arrived at upon just consideration of all uses for which it is suitable.

The applicable rule is not limited to developed property, but applies also to undeveloped property.

Niagara, Lockport & Ont. Power Co. v. *Horton*, 231 Appellate Division, N. Y. 402;
Ford Hydro-Electric Co. v. *Neely*, 13 Fed. (2) 361 Cert. den. 273 U. S. 723, 71 L. Ed. 859;
City of Chicago v. *Lehman*, 262 Ill. 468;
Weiser Valley Land Co. v. *Ryan*, 190 Federal 417.

The fact that the plaintiff is the only person who has thus far offered to purchase the property is immaterial.

San Diego Land and Town Co. v. *Neal*, 88 Cal. 50, 25 Pac. 977.

It is Respondent's contention that this Court in the *McCandless* case, supra, and the Circuit Court of Appeals, Seventh Circuit, in the *Ford* case, supra, (certiorari denied 273 U. S. 723, 71 L. Ed. 859) clearly and definitely marked the limits of proper and competent evidence in a case of this kind; and that Respondent has carefully observed those limits in offering its proof in the courts below.

Respondent desires to briefly refer to the *McCandless* case not heretofore discussed by it, and to amplify somewhat its reference to the *Ford* case in its main brief.

In the *Ford* case, where land was condemned for water power purposes, the scope of the owner's proof was almost identical with that of Respondent herein (See Respondent's main brief, page 77).

In that case the trial Court admitted evidence of an expert showing: (1) the approximate amount of power that would be available, (2) the value of that power per KW hour, (3) the probable expense of transmission and distribution, (4) production expense, (5) maintenance, (6) taxes, (7) general expenses, (8) depreciation, (9) the surplus that would be available after deducting expense.

The admission of the evidence above set out was assigned as error. The Circuit Court of Appeals affirmed the trial Court, holding the evidence to be competent.

The case of *McCandless* v. *United States*, 298 U. S. 342, 80 L. Ed. 1205, was a condemnation proceeding instituted by the United States as petitioner in the District Court for the District of Hawaii, to acquire title to some 4000 acres of land for a naval ammunition depot, and other purposes. The question was there raised as to the competency of evidence tending to establish the availability of a supply of water that might be brought to the land in question, at an expense consistent with its profitable use. Petitioners had in view the ultimate use of the land for growing sugar cane, which would require the bringing of water from a distance for irrigation purposes. After introducing evidence that some 3000 acres of the land in question would produce an average of from 70 to 75 tons of sugar cane to the acre and that from this there could be extracted eight or nine tons of sugar to the acre, and that the contour of the land was available to irrigation, and that it was adaptable to the purpose of a sugar plantation, the land owner offered to prove: (a) That they had been for many years negotiating for the development of a sugar plantation on the land, (b) that there were three sources of water supply,

from one or the other of which they had reason to expect water would have been developed for the land in question, but for the condemnation suit, (c) that any prospective purchaser of the land would, at the time this suit was brought, take into consideration the reasonableness of the possibility of securing a supply of water for the purpose of raising sugar cane, (d) that sugar cane lands in the territory generally required the bringing of water from other lands for irrigation, (e) that the availability of water for such purposes is a factor in determining the value of prospective sugar cane lands, (f) that such water in many instances is transported much greater distances than would be required in the pending case, (g) that petitioners own lands within these basins upon which wells may be sunk at distances from 8 to 10½ miles from the tract in question and the water last described recovered, (h) that there are valuable artesian basins from which for many years fresh artesian water had been and was available, unused and flowing to waste, amounting to approximately sixty million gallons a day, (i) that it was practically and economically feasible to transport such water from the lands within these basins to the tract in question, (j) that the cost of recovering and transporting such water would render the use of it economically feasible and profitable, (k) that such recovery and use of the water could be anticipated with reasonable certainty, (l) that the surplus water could be transported and used profitably for the cultivation of sugar cane, (m) that the cost of transporting it would be less per million gallons than incurred for recovery and transportation of water to other cane lands on the island. On objection, this evidence was excluded.

There was evidence as to how many gallons of water could be developed by sinking a shaft to the vicinity of sea level, the length of the tunnel depending on the location of the shaft.

The Circuit Court, while holding that the excluded evidence was competent, (and this, even though it appeared from the evidence that in order to supply the land in ques-

tion with a sufficient supply of water for the raising of sugar cane the water would have to be conducted not only across lands held in private ownership, but also across public lands), held that in virtue of the Statute 28 U. S. C. A. 391 the refusal of the trial court to admit the evidence was not of such prejudicial character as to require a new trial.

This court agreed with the Circuit Court of Appeals that the evidence complained of was competent, but granted a new trial on the ground that the Circuit Court of Appeals was in error in holding that the failure to admit the evidence was not prejudicial to the land owner.

The case of *Ranck* v. *City of Cedar Rapids*, supra, was cited with approval in *Weiser Valley Land Co.* v. *Ryan*, 190 Federal 417, and there the Circuit Court of Appeals, passing upon the competency of the evidence offered to show the value of land which was to be a part of an irrigation project, held it proper to admit upon the question of value, proof of a variety of facts including prospective profits, as will be shown by the following extract from the opinion (p. 423):

> "It would seem that the testimony admitted, accompanied as it was by the careful admonition of the witnesses by the court respecting the exact question to be answered, was not objectionable under the rule. Many things were taken into consideration by the witnesses pertaining to the irrigation project of the plaintiff—the cost of the land to be utilized, cost of construction and maintenance, the feasibility of utilizing the water, the prospective amount available, the lands available for irrigation, the value of those lands, and the value of the water furnished, and perhaps anticipated profits, all entering into account as forming the basis for judgment as to the value of the land sought to be appropriated."

In this same *Weiser Valley* case the Trial Court explained the purpose of admitting such proof in the following charge to the Jury:

> "The evidence is admitted because of the peculiar conditions surrounding this property. In other words,

> the Court must make a virtue of necessity, and it appearing doubtful whether or not the property has a market price from which you would determine the actual or market value of the lands, the evidence with regard to all these physical conditions has been permitted to go before you for the purpose of throwing some light upon the general question of their value, and not for the purpose of determining the precise profits, if any, of the scheme. It may or may not turn out to be profitable. If it turns out to be unprofitable, the defendants should still have just compensation for their lands * * * you are not to exclude from your consideration this evidence, you are to take it all into consideration for the purpose not of trying to determine definitely how profitable the scheme will be and of awarding to the defendants a part of those profits, or how unprofitable it will be, and then say you will not award them anything, because it will not be profitable, but you are to consider all of these facts and circumstances simply for the purpose of enabling you to reach an intelligent judgment as to what buyers and sellers would, in negotiations upon the open market, conclude the property was worth in September, 1909."

In *United Fuel Gas Co.* v. *Railroad Commission*, 278 U. S. 300, 73 L. Ed. 390 also relied upon by the Government, the Court was asked to restrain the Railroad Commission of the State of Kentucky from establishing an alleged confiscatory rate for the sale of natural gas in certain cities, or, in the alternative, from preventing the plaintiffs from withdrawing their services in the sale and distribution of natural gas to consumers in the cities in question.

The question presented was whether the rate prescribed by the Commission was confiscatory. The burden was on the plaintiff to establish this one fact by "clear and convincing" evidence, and by evidence which was required to show "to the satisfaction of the Court" that the prescribed rate would necessarily be so confiscatory in fact as to violate the constitution of the United States. *Knoxville* v. *Knoxville Water Co.*, 212 U. S. 1; 53 L. Ed. 371

The question turned upon the valuation of some 800,000 acres embraced in gas fields, part of which was "proven" territory which was in use at the time, and the remainder was held as "probable" or "unfavorable" sources of future production. Some 41,000 acres were owned in fee by plaintiff and the remainder was controlled by leases or contracts and was in widely scattered areas.

Plaintiff proposed to establish the value of this property by showing by experts, on the basis of geological or mining engineering data the total volume of gas underlying the "proven" and "probable" territory, and by other experts, its present exchange value or price if sold by a willing seller to a willing buyer. Their case rested on the prediction that the estimated amount of gas would be available, as required, through a period of eighteen years; that natural gas so transported and used as fuel would command a price of 30c to 35c per cubic foot through that period, in a market to be established, despite the changes wrought by invention and improved business methods; and a further prediction not only of what plant and equipment must be constructed and maintained to effect delivery of the gas for this period to consumers in the City of Pittsburgh, but also of the cost through a like period, of the construction, maintenance and operation of that plant and equipment.

The Court held that the evidence was wanting in probative force sufficient to establish "to the satisfaction of the Court" that the rates established were confiscatory. It will be noted that the evidence in that case rested on a presumption as to how much and at what price gas on both "proven" and "probable" or "unfavorable" property could be produced a number of years later.

Further, plaintiffs undertook to show their potential profits by direct proof of value rather than using such proof as one of the factors to be considered in estimating the value of property.

The question in that case was: "Was the rate established by the Railroad Commission confiscatory?" This required an answer of either "Yes" or "No", and the Court held the

evidence was not of sufficient probative force to justify an affirmative answer.

In the instant case the evidence complained of was introduced, along with other evidence, including a personal inspection of the property by the Commissioners, for the purpose of enabling the Court to arrive at a proper figure in the light of all the evidence which would award respondent just compensation for the property condemned.

If the Evidence Was Incompetent, Did Its Introduction Constitute Reversible Error?

If it were admitted that the evidence in question was incompetent, which it is not, the presumption is that the Court acted only upon the competent evidence, and since there is ample unquestioned evidence to support the verdict, petitioner is not entitled to a new trial.

We wish to call the Court's attention, in addition to the authorities heretofore cited on this question (respondent's main brief p. 85), to the case of:

Grayson v. *Lynch*, 163 U. S. 468 (471), 41 L. Ed. 230 (233).

There the case was tried in the District Court of the Territory of New Mexico and involved damages to a herd of cattle by a disease known as Texas Cattle Fever claimed by plaintiff to have been communicated to his cattle by cattle owned by the defendants.

The case was tried without a jury. The Court awarded damages in the amount of $5200. The case was appealed to the Supreme Court of the territory. From a judgment on the award in that Court, the case was carried to this Court for review.

Assignments of error were taken to the action of the Court in ruling that upon a trial by the court, without a jury, the admission of improper, incompetent, irrelevant or immaterial evidence was not cause for reversal; that in

such case on appeal the Court will give no weight to such testimony in the determination of such appeal and will not reverse the judgment because such evidence was admitted, unless it appeared that the Court in making its decision relied upon such irrelevant evidence, and that a finding of fact in a case at law, tried without a jury, is conclusive where there is sufficient evidence upon which to found it, even though the evidence be conflicting.

This Court in discussing the case, said:—

> "We think there is nothing in the statute to take this case out of the general rule so frequently announced, that in cases where a jury is waived, the findings of fact by the Court have the same force and effect as the verdict of a jury, and that the appellate court will not set aside the findings and order a new trial for the admission of incompetent evidence if there be other competent evidence to support the conclusion."

Severance Damages

In our original brief (p. 97), we discussed the subject of severance damages at length. We wish here to add only a few words. In its award (R. 1075, and 113 Fed. (2) 89), the Court allowed $111,791.23 as severance damages. Petitioner complains that the award was rested, not upon an allowance for contiguous tracts or for tracts used together as a unit at the time of the taking, but for tracts wholly separated (Pet. original brief, page 22).

Attention is called to the fact that the allowance of severance damages to non-contiguous tracts constituted a very small part of the $111,791.23. The items composing this figure included $83,562.50 (R. 1075), for lands in the Appalachia reservoir. By reference to Res. Comm. Exhibit R-8, tab 2, it will be seen that the lands for which the $83,562.50 was awarded, are contiguous to the lands condemned. In the space on the chart, below the Powelson (Hiwassee) dam, where very little red (lands wholly owned

by Southern States Power Company) is indicated, Respondent owned the flowage rights to a contour line embracing the flooded area, thus connecting the entire boundary. This leaves the amount of only $28,328.72 awarded as severance damages for non-contiguous property.

CONCLUSION.

The judgment below should be affirmed.

Respectfully submitted,

GEORGE LYLE JONES,
GEORGE H. WRIGHT,
Attorneys for Respondent.

APPENDIX A

Legislative History of Section 25 of the Tennessee Valley Authority Act

As stated by Petitioner in the Appendix to its brief on re-argument, this Act is the outgrowth of four bills introduced in the 73rd Congress, namely S-1272 introduced by Senator Norris, H.R. 4859 introduced by Rep. McSwain, H.R. 4860, introduced by Rep. Almon, and H.R. 5081, introduced by Rep. Hill. Hearing on the three bills introduced in the House were held before the House Committee on Military Affairs and that Committee reported to the House H.R. 5081.

As originally introduced, this Bill and the other House Bills referred to contained provisions relating to condemnation of lands very similar to those contained in the Norris Bill introduced in the Senate, but the House Committee on Military Affairs struck these provisions from H.R. 5081. As reported to the House, that Bill provided in Section 23 for a hearing before three commissioners, an appeal from their report and award to the District Court where there was to be a trial before the District Judge and a jury, and an appeal from the final judgment of the District Court in like manner as appeals in other cases.

As thus reported, H.R. 5081 passed the House and went to the Senate where it was referred to the Committee on Agriculture and Forestry. This Committee amended the House Bill by striking out everything after the enacting clause and inserting what was substantially the Norris Bill above referred to. No hearings were held by the Senate Committee and there appears to have been no report of the Committee accompanying that Bill, nor discussion of the measure on the floor of the Senate, in which anything was said about the provisions of the Bill with respect to condemnation proceedings.

Those provisions were in Section 26 of the Bill as reported to the Senate.

As far as the duties of the Commissioners, the procedure before them, the appeal to the District Court, the hearing there, and the appeal to the Circuit Court of Appeals and the hearing there are concerned, Section 26 of the Bill as it passed the Senate is identical with the provisions of Section 25 of the Act as finally adopted.

The measure was sent to conference where two additional sections were added. These dealt with the effect of the acceptance of an award and with procedure in those cases where a property owner was under disability. Due to other changes in the Act, Section 26 as the Bill passed the Senate became Section 25 as the Bill was reported by the conferees. In the Conference Report the following reference is made to provisions for condemnation proceedings:

> "Provisions for condemnation proceedings in both House Bill and Senate Amendment were modified so as to insure expeditious acquisition of property and were incorporated in the Conference Amendment."

This plainly refers to the addition made to Section 25 by the Conferees.

From the Report of the hearings before the House Committee on Military Affairs, it seems not unlikely that the Department of Justice was consulted in connection with the provisions contained in Section 25 of the Act as finally adopted.

It appears from the hearings before the House Committee on Military Affairs that these provisions in the three Bills before it, similar to the provisions for condemnation proceedings in Section 25 of the Act as finally adopted, were framed with the idea of making it certain that the Government would be protected against exorbitant awards in condemnation cases which sometimes resulted from jury trials. It was apparently felt that provisions under which six Federal Judges, three in the District Court and three in the Circuit Court of Appeals, would pass upon the facts and fix the awards, insured a final result of which the United States would have no cause to complain.

APPENDIX B

Draft of Agreement Between Tennessee Valley Authority and Commonwealth & Southern Corporation

Pet. Ct. Exhibit P.

: 3—Draft by C. & S.
: Aug. 12, 1939
(as initialed by JAK and WLW)

Term

Term of the contract shall be for Ten Years but the Authority or the Company may cancel at any time on Eighteen Months' written notice.

Delivery of Power

(a) Authority agrees to deliver and the Company agrees to pay for a total of 6,250,000 KWH of energy each week during January, February, March, April and May of each calendar year, of which energy not less than 5,000,000 KWH shall be delivered at a uniform rate during the Eighty Hour weekly peak period of the system of the Company unless the Company otherwise directs, subject, however, to the peak period curtailment provisions hereof.

Authority agrees to deliver and the Company agrees to pay for a total of Ten Million KWH of energy each week during June, July, August, September, October, November, and December of each calendar year and of which not less than 5,000,000 KWH are to be delivered at a uniform rate during the Eighty Hour weekly peak period of the system of the Company.

The Company is not obligated to take or pay for energy which may be generated by the Authority in its steam plants.

Provided the Company has hydro capacity available which is not in operation, the Company will on request of the Authority, permit the Authority to suspend delivery of all or part of the power during the Authority's peak hours, provided that such suspension shall not exceed three hours in any one day or fifteen hours in any one week and provided that the Authority will on the request of the Company furnish the Company at a uniform rate with 5,000,000 KWH during the remaining hours of the weekly peak period of the system of the Company.

Authority shall not be obligated to deliver more than 50,000 KW during its system peak hours (which shall not exceed four hours in any one day or fifteen hours in any one week) or more than 77,000 KW at any time.

As long as the Company owns the Wilson/Gorgas and Guntersville/Gadsden transmission lines the rates to be paid for the above power shall be as follows:—

Monthly Demand Charge—$54,000.

Energy Charge—shall be computed on the Authority's A-1 wholesale rate for non-transmitted power, based on all hydro and steam power delivered, which rate so determined in mills per KWH shall be applied to the actual KWH of hydro power received; and 3½ mills shall be applied to the actual KWH of steam power received.

Load factor adjustment to be premised on 60,000 KW demand.

The Company shall not be billed for steam generation when Authority is operating steam only for purposes of load control, system stabilization or local protection.

(b) Authority may deliver and the Company may take, when, as and if, hydro power in excess of the energy

purchased under Subsection (a) above for replacement of steam running at the following rates:

In replacement of Atkinson	1.35 Mills
In replacement of Gorgas #2	1.35 "
In replacement of Gorgas #1	1.70 "
In replacement of the next 15,000 KW of secondary steam plants	2.60 "
In replacement of the next 10,000 KW of Secondary steam plants	3.00 "
In replacement of all over 25,000 KW in excess of Atkinson, Gorgas #2 and Gorgas #1	3.50 "

(c) Company may deliver and the Authority may take when, as, and if, hydro power in replacement of steam running as provided below:

In replacement of Hales Bar and Memphis steam plants	1.8 Mills
In replacement of the Nashville steam plant	2.0 "
In replacement of the Parksville steam plant	2.6 "

(d) Authority agrees to deliver to Company steam energy in the amounts requested by Company whenever and to the extent that Authority has surplus steam capacity. Upon receiving notice from the Company of its intention to purchase excess steam energy, Authority shall make such energy available to Company as soon after receipt of the notice as possible. Excess steam energy will be sold by Authority to Company at the following rates:

First 40,000 KW per hour @ 5 Mills per KWH

Excess over 40,000 KW per hour @ 7 Mills per KWH

Company agrees to request delivery of excess steam energy in specified amounts but not less than 10,000 KW and agrees to pay a minimum bill of 50¢ per KW for the first 40,000 KW requested. If Company requests deliveries in excess of 40,000 KW, Company agrees to take not less than 100 hours use of such excess at 7 Mills per KWH.

(e) Company agrees to deliver to Authority steam energy in the amounts requested by Authority whenever and to the extent that the Company has surplus steam capacity. Upon receiving notice from the Authority of its intention to purchase excess steam energy, Company shall make such energy available to Authority as soon after receipt of the notice as possible. Excess steam energy will be sold by Company to Authority at the following rates:

First	40,000 KW per hour @ 5 Mills per KWH
Excess over	40,000 KW per hour @ 7 Mills per KWH

Authority agrees to request delivery of excess steam energy in specified amounts but not less than 10,000 KW and agrees to pay a minimum bill of 50¢ per KW for the first 40,000 KW requested. If Authority requests deliveries in excess of 40,000 KW, Authority agrees to take not less than 100 hours use of such excess at 7 mills per KWH.

GENERAL

Delivery of power under this agreement is to be made at interchange points on the West Point/Gorgas line at the intersection of the Mississippi/Alabama state line; on the Ridgedale/Lindale line at the intersection of the Georgia/Tennessee state line; on the Gorgas/Sheffield line at Muscle Shoals; on the Guntersville/Gadsden line at the Guntersville Dam. The total of all energy delivered monthly at the four interchange points shall be used to determine the energy charge under the Authority's A-1 wholesale rate for non-transmitted power.

Authority guarantees hydro deliveries at least 60% of the time during the first two years; 65% of the time during the first four years; 70% of the time for the first nine years and 75% of the time for the first ten years and thereafter.

(a) Reciprocal emergency standby clause.

(b) Force Majure clause as per Electro-Met. Contract.

(c) Usual TVA clauses covering metering, billing, liability, advance schedules of power taking, notices, waivers, consent or approval of public bodies and assignment.

(d) C & S of New York, Agent.

(Signed) O. K. W. L. Wilkie
(Signed) O. K. J. A. Krug

APPENDIX C

Part 1.

Calculation of the Cost of Non-Dependable Hydro-Energy Under the Terms of the Commonwealth and Southern Contract, Court Exhibit "P".

ENERGY CHARGE DURING FIRST 5 MONTHS

During 5 months Jan., Feb., Mar., Apr. & May, monthly consumption = 6,250,000 K.W.hrs. x 4⅓ weeks	27,083,333 K.W.Hrs.	
First 100,000 K.W.Hrs. per month @ 4 mills		= $ 400
Next 200,000 K.W.Hrs. per month @ 3 mills		= 600
Next 700,000 K.W.Hrs. per month @ 2.5 mills		= 1,750
Remaining 26,083,333 K.W.Hrs. @ 2 mills		= 52,166
Gross monthly energy charge only		$ 54,916
360 x 60,000 K.W. demand	21,600,000 K.W.Hrs.	
Excess over 21,600,000 K.W.Hrs.	= 5,483,333 K.W.Hrs.	
Reduction in energy charge = 5,483,333 K.W.Hrs. @ 0.5 mills		= $ 2,741
Monthly energy charge for each of the 5 months (Jan., Feb., Mar., Apr. & May)		= $ 52,175
Total Energy charge for these 5 months (excluding demand charge)		= $260,875

ENERGY CHARGE DURING LAST 7 MONTHS

During 7 months June, July, Aug., Sept., Oct., Nov. & Dec., monthly consumption = 10,000,000 K.W.hrs. x 4⅓ weeks	43,333,333 K.W.Hrs.	
First 1,000,000 K.W.Hrs. (see above)		$ 2,750
Remaining 42,333,333 K.W.Hrs. @ 2 mills		= 84,667

Gross monthly energy charge only		$ 87,417
Excess over 21,600,000 K.W.Hrs. (see above)	= 21,733,333 K.W.Hrs.	
Reduction in energy charge = 21,733,333 K.W.Hrs. @ 0.5 mills		= $ 10,867
Monthly energy charge for each of the 7 months (June, July, Aug., Sept., Oct., Nov. & Dec.)		= $ 76,550
Total Energy charge for these 7 months (excluding demand charge)		= $535,850

TOTAL ANNUAL ENERGY CHARGE

Total for 5 months (energy charge only)	$260,875
Total for 7 months (energy charge only)	535,850
Total for 12 months (energy charge only)	$796,725
Less 10% of energy charge (non-transmitted power)	79,673
Net Total Annual Energy Charge	$717,052
Average Net Annual Energy Charge per K.W.Hr. for non-dependable hydro-energy	1.634 mills

ANNUAL DEMAND CHARGE

Annual Demand Charge @ $54,000 per month	$648,000
Annual Demand Charge per K.W.Hr.	1.479 mills

TOTAL ANNUAL CHARGE FOR NON-DEPENDABLE HYDRO-ENERGY

Total Annual Charge for Hydro-Energy	$1,365,052
Total Annual Charge per K.W.Hr.	3.113 mills

Part II.

Calculation of the Cost per K.W.Hr. of Steam Power to Combine with Non-Dependable Hydro-Secondary Power in Order to Deliver 100% Annual Load Factor Dependable Primary Power.

Contract energy charge per K.W.Hr.	3.50 mills
Demand Charge per K.W.Hr. (see p. ix)	1.479 mills
Total cost of steam power per K.W.Hr.	4.979 mills

Part III.

Total Annual Cost and Cost per K.W.Hr.* of 100% Annual Load Factor Dependable Power Under the Terms of Commonwealth and Southern Corporation Contract, Exhibit "P".

If Contract Runs 2 Years:

Annual delivery	438,000,000	K.W.Hrs.
Hydro 60%	262,800,000	"
Steam 40%	175,200,000	"
262,800,000 K.W.Hrs. @ 3.113 mills (see p. ix)	$ 818,096.40	
175,200,000 K.W.Hrs. @ 4.979 mills (see Part II above)	$ 872,320.80	
Total 438,000,000 K.W.Hrs.	$1,690,417.20	
Average cost	3.859 mills	per K.W.Hr.

If Contract Runs 4 Years:

Annual delivery	438,000,000	K.W.Hrs.
Hydro 65%	284,700,000	"
Steam 35%	153,300,000	"
284,700,000 K.W.Hrs. @ 3.113 mills	$ 886,271.10	
153,300,000 K.W.Hrs. @ 4.979 mills	$ 763,280.70	
Total 438,000,000 K.W.Hrs.	$1,649,551.80	
Average cost	3.766 mills	per K.W.Hr.

* NOTE: Since contract may be cancelled upon 18 months notice the costs and prices after two years may never become applicable

If Contract Runs 9 Years:

Annual delivery	438,000,000 K.W.Hrs.
Hydro 70%	306,600,000 "
Steam 30%	131,400,000 "
306,600,000 K.W.Hrs. @ 3.113 mills	$ 954,445.80
131,400,000 K.W.Hrs. @ 4.979 mills	$ 654,240.60
Total 438,000,000 K.W.Hrs.	$1,608,686.40
Average cost	3.673 mills per K.W.Hr.

If Contract Runs 10 Years or More:

Annual delivery	438,000,000 K.W.Hrs.
Hydro 75%	328,500,000 "
Steam 25%	109,500,000 "
328,500,000 K.W.Hrs. @ 3.113 mills	$1,022,620.50
109,500,000 K.W.Hrs. @ 4.979 mills	$ 545,200.50
Total 438,000,000 K.W.Hrs.	$1,567,821.00
Average cost	3.579 mills per K.W.Hr.

APPENDIX D

Tennessee Valley Authority

"Wholesale Power Rate—Schedule A-1

Demand Charge

Ninety cents per kilowatt of demand per month.

Energy Charge

First 100,000 K.W.hrs consumed per month @ 4 mills per K.W.hr.

Next 200,000 K.W.hrs. consumed per month @ 3 mills per K.W.hr.

Next 700,000 K.W.hrs. consumed per month @ 2.5 mills per K.W.hr.

Excess over 1,000,000 K.W.hrs. consumed per month @ 2 mills per K.W.hr.

Charge for energy in excess of 360 times the demand shall be subject to a reduction of 0.5 mills per K.W.hr. from the otherwise applicable rate."

APPENDIX E

Method of Calculating Cost of 512,500,000 K.W.Hrs. Per Annum of 35% Annual Load Factor Primary Power if Consumed in Equal Monthly Quantities, under TVA Wholesale Power Rate— Schedule A-1

A delivery of 512,500,000 K.W.hrs. per annum in equal monthly quantities would require 42,708,333 K.W.hrs. per month. A monthly energy consumption of 360 times the demand of 167,200 K.W. would amount to 60,192,000 K.W.hrs. per month.

Having calculated this data, the monthly bill for 42,708,333 K.W.hrs. per month is calculated, pursuant to the TVA Wholesale Power Rate—Schedule A-1, as follows:

Monthly Bill

Demand charge: 167,200 K.W. @ $0.90			$150,480.00
Energy charge:			
First 100,000 K.W.hrs. @ 4 mills	$ 400.00		
Next 200,000 " " @ 3 mills	600.00		
Next 700,000 " " @ 2.5 mills	1,750.00		
1,000,000	$ 2,750.00		
Next 41,708,333 K.W.hrs. @ 2 mills	83,416.66		
42,708,333	$86,166.66	86,166.66	
Total cost of 42,708,333 K.W.hrs. per month at 35% annual load factor			$236,646.66
Deduction for consumption over 60,192,000 K.W.hrs. per month			None
Cost to consumer of delivered primary power at 35% annual load factor			5.54 mills per K.W.hr.

Let this be compared with Mr. Moreland's estimate that 35% annual load factor Saluda type super primary power could not be sold for more than 3.02 mills per K.W.hr.

Thus, Mr. Moreland's estimate of said selling price is but 54.5% of the price which TVA has declared to be "a fair market price" for primary power at 35% annual load factor.

APPENDIX F

Excerpts from Agreement Among Tennessee Valley Authority, Arkansas Power & Light Company and Mississippi Power & Light Company.

Pet. Ct. Exhibit Q.

THIS AGREEMENT made and entered into this day of May 1939, by and among the Tennessee Valley Authority, a corporation created and now existing by act of Congress of the United States, approved by the President of the United States of America May 18, 1933, as amended, hereinafter referred to as "Authority", and Arkansas Power and Light Company, a corporation of the State of Arkansas hereinafter referred to as "Arkansas Company", and Mississippi Power and Light Company, a corporation of the State of Florida, hereinafter referred to as "Mississippi Company",

WITNESSETH:

WHEREAS, Authority, in order to secure otherwise unavailable revenue and thus be able on the most advantageous basis to supply power to municipalities and other preferred customers, desires to sell such amounts of otherwise unsalable and waste energy as Arkansas Company and Mississippi Company may be able to utilize economically; and

* * * * * * *

ARTICLE I

TERM OF AGREEMENT

This agreement shall become effective on the closing date, as that date is defined in the Contract of purchase and sale of properties between Memphis Power and Light

Company, the City of Memphis, Memphis Light, Gas and Water Division, and Authority, and shall continue in effect until May 31, 1958, and thereafter unless and until terminated by any party hereto as of May 31, 1958, or as of any later date by written notice given two (2) years in advance; provided this agreement shall be terminable on five (5) years' notice given with respect to any dates during the first ten (10) years of this agreement, and on two (2) years' notice thereafter and prior to May 31, 1958.

ARTICLE II

SUPPLY OF WASTE ENERGY BY AUTHORITY

1. *Class of Energy to be Supplied:* As distinguished from firm power and secondary power and any other types of power carrying any guarantee on continuity or availability, the energy to be supplied by Authority, hereunder, hereinafter sometimes referred to as "waste energy" shall be such energy as can be generated from time to time by Authority by means of hydro-electric generating equipment which otherwise would be idle, and by utilization of water at its dams which otherwise would be wasted over or through said dams without being utilized for generation of electric energy. Authority shall be under no obligation hereunder to release or store water at its storage reservoirs for supply of waste energy hereunder; but will endeavor, so far as may within Authority's judgment be practicable and consistent with navigation and flood control, so to utilize otherwise waste water as to permit supply of waste energy for as many days each year as may be feasible.

Authority will supply such energy to Arkansas Company and to Mississippi Company, if and when and to the extent so available, and within the limits of available transmission facilities, but only subject to prior require-

ments of Authority's other customers; provided, however, that Arkansas Company and Mississippi Company, shall be entitled to receive such energy, when available, pro rata with other purchasers of energy of a similar class at equivalent rates, and in preference to other purchasers of energy of a similar class at lower rates, but shall not have priority over other parties purchasing or offering to purchase waste energy at higher rates.

* * * * *

2. *Amounts of and Rates for Energy to be Supplied:* Beginning with the day (hereinafter sometimes called initial joint use date) when the Fourth Street Generating Station becomes available for the joint use of Memphis Power & Light Company, or its successor in interest, and of Authority, as provided in Section 3 of the generating station agreement, which is Exhibit "M" to that certain sale contract between Memphis Power & Light Company, the City of Memphis, Memphis Light, Gas and Water Division, and Authority, and subject to the provisions of this Article II, Authority will offer Arkansas Company and Mississippi Company jointly up to 25,000 KW of waste energy at the then current market price (in any event not over 1.5 mills per kwh).

Arkansas Company and Mississippi Company will take, or pay for if not taken, all such waste energy up to 25,000 KW which Authority may tender to them during specified hours (in any event not less than 2,000 hours) in the period from June to November, inclusive, of each year. The said specified hours shall be such as may be set forth in schedules to be submitted to Authority by said Companies from time to time.

In arriving at rates for waste energy, the parties will take into account the savings resulting from displacement of steam generation on the basis of sharing between Authority and the Companies the difference between such total savings and a base price for waste energy.

* * * * *

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed and delivered by their duly authorized officers.

TENNESSEE VALLEY AUTHORITY

By .....

Attest:

.....

ARKANSAS POWER & LIGHT COMPANY

By .....

Attest:

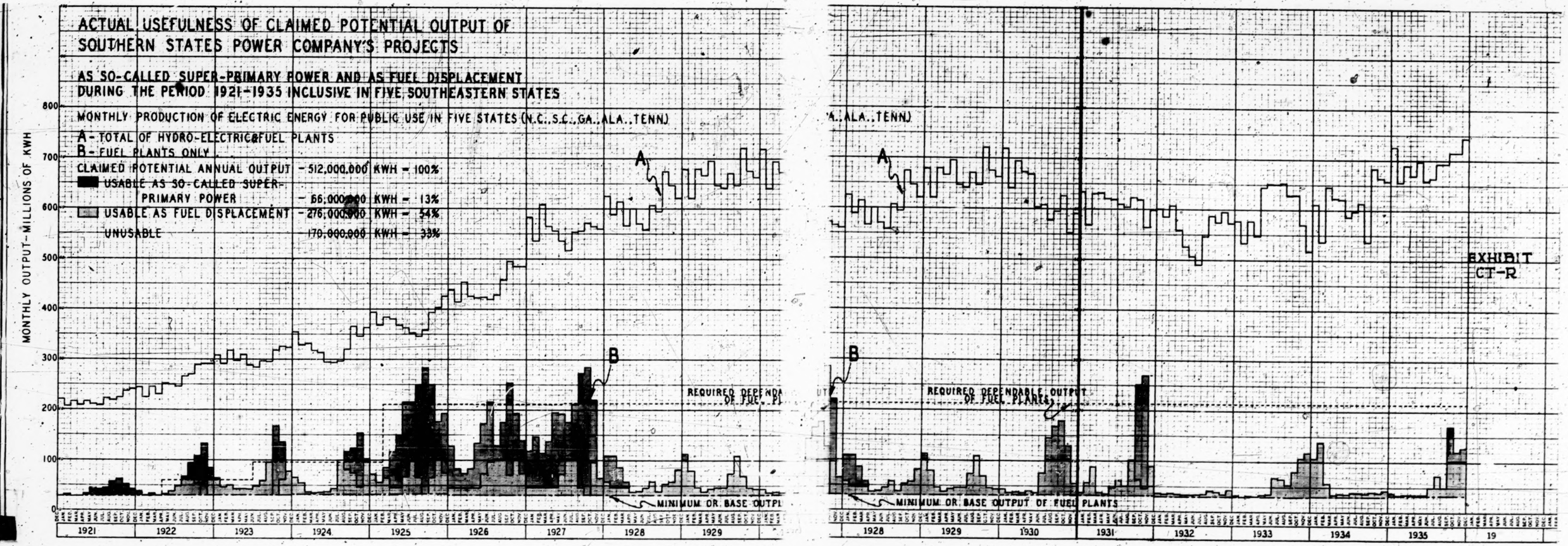
.....

MISSISSIPPI POWER & LIGHT COMPANY

By .....

Attest:

.....


ACTUAL USEFULNESS OF CLAIMED POTENTIAL OUTPUT OF SOUTHERN STATES POWER COMPANY'S PROJECTS
AS SO-CALLED SUPER-PRIMARY POWER AND AS FUEL DISPLACEMENT
DURING THE PERIOD 1921-1935 INCLUSIVE IN FIVE SOUTHEASTERN STATES
MONTHLY PRODUCTION OF ELECTRIC ENERGY FOR PUBLIC USE IN FIVE STATES (N.C., S.C., GA., ALA., TENN.)
A - TOTAL OF HYDRO-ELECTRIC & FUEL PLANTS
B - FUEL PLANTS ONLY
CLAIMED POTENTIAL ANNUAL OUTPUT - 512,000,000 KWH - 100%
USABLE AS SO-CALLED SUPER-PRIMARY POWER - 66,000,000 KWH - 13%
USABLE AS FUEL DISPLACEMENT - 276,000,000 KWH - 54%
UNUSABLE - 170,000,000 KWH - 33%
MONTHLY OUTPUT-MILLIONS OF KWH
800
700
600
500
400
300
200
100
0
A
B
REQUIRED DEPENDABLE OUTPUT OF FUEL PLANTS
MINIMUM OR BASE OUTPUT OF FUEL PLANTS
1921
1922
1923
1924
1925
1926
1927
1928
1929
1930
1931
1932
1933
1934
1935
EXHIBIT CT-R